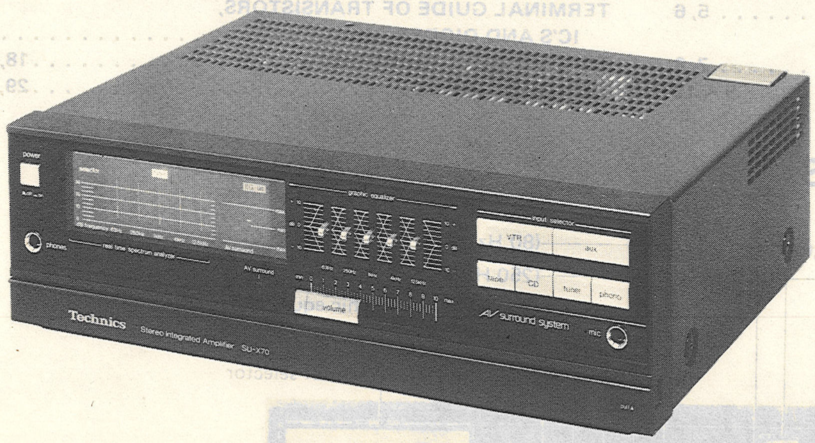
ORDER NO. HAD85022421C9

Service Manual

Stereo Integrated Amplifier

Amplifier

SU-X70



Color
(K)...Black Type

Color	Areas
(K)	[EX] .....Continental Europe
(K)	[EF] .....France
(K)	[Ei] .....Italy
(K)	[EK] .....United Kingdom
(K)	[EH] .....Holland
(K)	[EGA] ...F.R. Germany
(K)	[EB] .....Belgium
(K)	[EW] .....Switzerland
(K)	[XA] .....Asia, Latin America, Africa, Middle Near East and Oceania
(K)	[XL] .....Australia

SPECIFICATIONS
(DIN 45 500)

■ AMPLIFIER SECTION

40 Hz~20 kHz continuous power output	
both channels driven	2 × 35W (8Ω)
1 kHz continuous power output	
both channels driven	2 × 42W (8Ω)
Total harmonic distortion	
rated power at 40 Hz~20 kHz	0.05% (8Ω)
half power at 20 Hz~20 kHz	0.05% (8Ω)
half power at 1 kHz	0.005% (8Ω)
Intermodulation distortion	
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.05%
Power bandwidth	
both channels driven, −3 dB	10 Hz~25 kHz (8Ω)
Damping factor	40 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
TUNER, AUX, CD, VTR	150 mV/22kΩ
TAPE	150 mV/22kΩ
MIC	1.5 mV/10kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
MIC maximum input voltage (1 kHz, RMS)	75 mV
S/N	
rated power (8Ω)	
PHONO	71 dB (IHF, A: 72 dB)
TUNER, AUX, TAPE, CD, VTR	84 dB (IHF, A: 84 dB)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
TUNER, AUX, TAPE, CD, VTR	10 Hz~70 kHz (−3 dB)
Graphic equalizer/spectrum analyzer frequency	80 Hz, 250 Hz, 1 kHz, 4 kHz, 12.5 kHz
Graphic equalizer range of variation	±10 dB
Spectrum analyzer dynamic range	30 dB
Output voltage	
REC OUT	150 mV
Channel balance, AUX 250 Hz~6,300 Hz	±1.0 dB
Channel separation, AUX 1 kHz	55 dB
Headphones output level and impedance	420 mV/330Ω
Load impedance	
MAIN	8Ω~16Ω
SURROUND	8Ω~16Ω

■ GENERAL

Power consumption	205W
Power supply	
For United Kingdom and Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/127V/220V/240V
Dimensions (W×H×D)	315 × 99 × 246 mm (12-13/32" × 3-29/32" × 9-22/32")
Weight	4.5 kg (9.9 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo Office
Matsushita Electric Trading Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105, Japan

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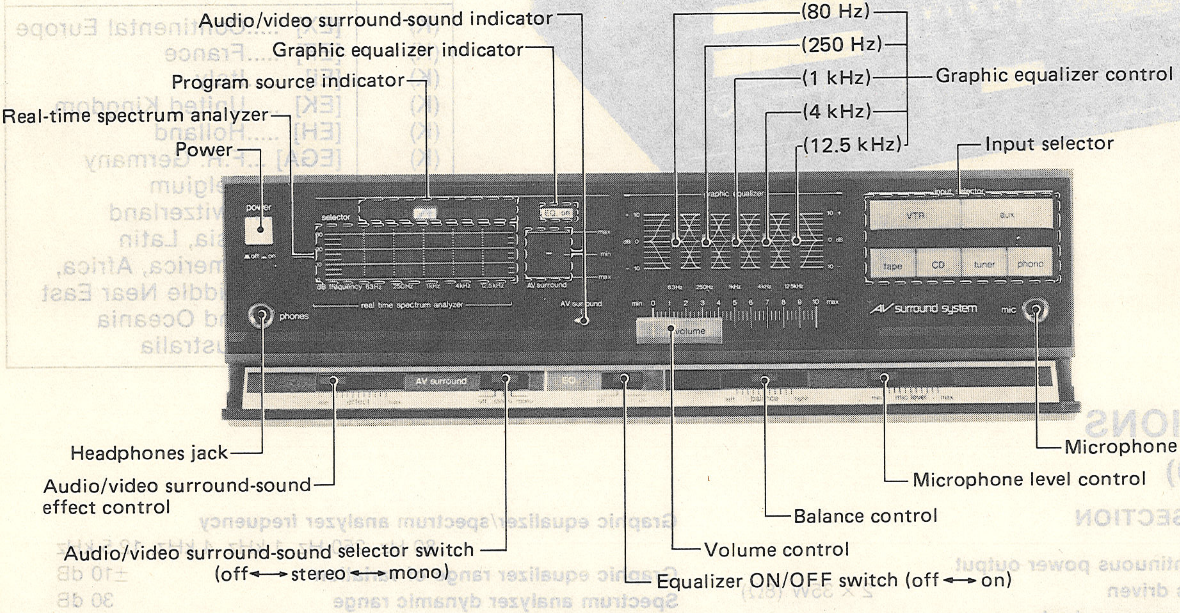
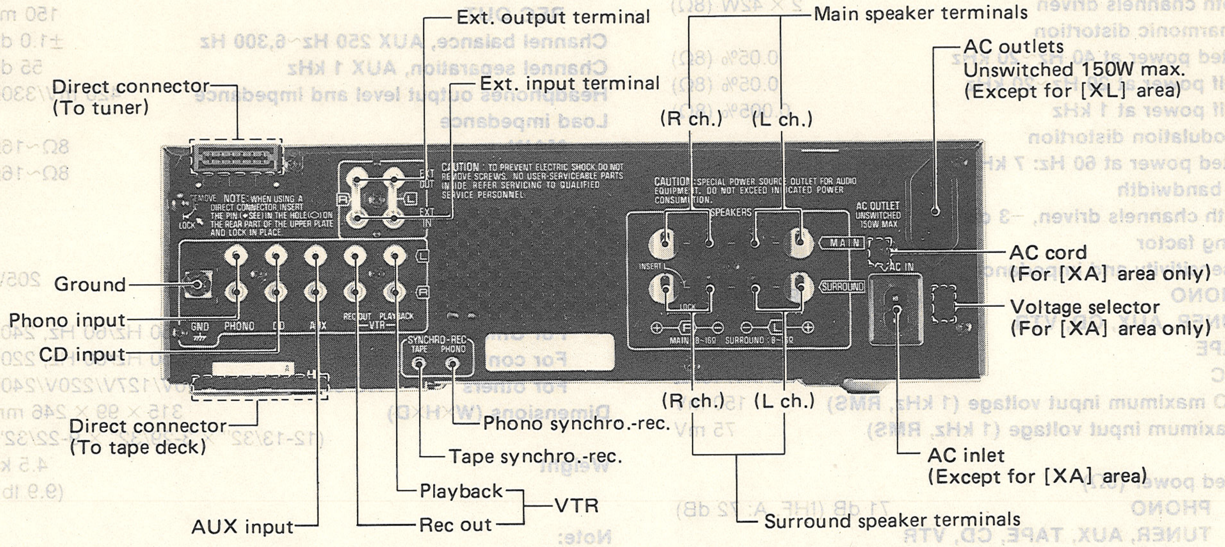
■ LOCATION OF CONTROLS



Audio/video surround-sound indicator
Graphic equalizer indicator
Program source indicator
Real-time spectrum analyzer
Power
(80 Hz)
(250 Hz)
(1 kHz)
(4 kHz)
(12.5 kHz)
Graphic equalizer control
Input selector
Headphones jack
Audio/video surround-sound effect control
Audio/video surround-sound selector switch (off←→stereo←→mono)
Equalizer ON/OFF switch (off←→on)
Volume control
Balance control
Microphone level control
Microphone jack



Ext. output terminal
Ext. input terminal
Main speaker terminals
(R ch.)
(L ch.)
AC outlets
Unswitched 150W max.
(Except for [XL] area)
Direct connector
(To tuner)
Ground
Phono input
CD input
Direct connector
(To tape deck)
AUX input
Phono synchro.-rec.
Tape synchro.-rec.
Playback
Rec out
VTR
(R ch.)
(L ch.)
Surround speaker terminals
AC cord
(For [XA] area only)
Voltage selector
(For [XA] area only)
AC inlet
(Except for [XA] area)

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram (Separate service manual : Order No. HAD8502242lC9-A) and the replacement parts list.
  - ★ [XA], [PA], [PE] areas are provided with voltage selector.
  - ★ 240V (50/60 Hz) for Australia and United Kingdom.
  - ★ 220V (50/60 Hz) for Continental Europe.
  - ★ 110V/127V/220V/240V (50/60 Hz) for other areas. ([XA])
  - ★ Phono input capacitance is about 150pF.

ORDER NO. HAD85022421C9-A

SU-X70

Stereo Integrated Amplifier

- This booklet includes the specifications of Model SU-X70 (Order No. HAD85022421C9) written in German, French and Spanish, and the circuits to be changed according to areas.
- File this booklet together with the service manual of Model SU-X70.

- Dieses Büchlein umfaßt die technischen Daten für Modell SU-X70 (Bestell Nr. HAD85022421C9) in den Sprachen Deutsch, Französisch und Spanisch, sowie die entsprechend dem Gebiet zu ändernden Schaltungen.
- Bewahren Sie dieses Büchlein zusammen mit dem Service-Handbuch für Modell SU-X70 auf.

- Cette brochure comprend les spécifications du Modèle SU-X70 (N° d'order HAD85022421C9) écrites en allemand, en français et en espagnol, et explique les circuits devant être modifiés selon les régions.
- Classer cette brochure en même temps qu'avec le manuel de service du Modèle SU-X70.

- Este librito incluye las especificaciones de Modelo SU-X70 (Pedido Nº HAD85022421C9) escritas en alemán, francés y español, y los circuitos a cambiarse según las áreas.
- Guardar este librito juntamente con el manual de servico de Modelo SU-X70.

los circuitos a cambiarse según áreas.

DEUTSCH

■ TECHNISCHE DATEN

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 40 Hz ~ 20 kHz	
beide Kanäle ausgesteuert	2 × 35W (8 Ω)
Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 42W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 40 Hz ~ 20 kHz	0,05% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz	0,05% (8 Ω)
halbe Nennleistung bei 1 kHz	0,005% (8 Ω)
Intermodulationsfaktor	
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,05%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	10 Hz ~ 25 kHz (8 Ω)
Dämpfungsfaktor	40 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
Tuner, Aux, CD, VTR	150 mV/22 kΩ
Tape	150 mV/22 kΩ
Micro (MIC)	1,5 mV/10 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Maximale MIKROFON-Eingangsspannung (1 kHz, eff.)	75 mV
Geräuschspannungsabstand	
Nennleistung (8 Ω)	
Phono	71 dB (nach IHF, A: 72 dB)
Tuner, Aux, Tape, CD, VTR	84 dB (nach IHF, A: 84 dB)
Frequenzgang	
Phono	RIAA-Standardkurve, ±0,8 dB (30 Hz ~ 15 kHz)
Tuner, Aux, Tape, CD, VTR	10 Hz ~ 70 kHz (−3 dB)

Equalizer/Spektrumanalysator-Frequenz	80 Hz, 250 Hz, 1 kHz, 4 kHz, 12,5 kHz
Einstellbereich des Equalizers	±10 dB
Dynamikbereich des Spektrumanalysators	30 dB
Ausgangsspannung	
Aufnahmeausgang (REC OUT)	150 mV
Kanalabweichung (Aux, 250 Hz ~ 6300 Hz)	±1,0 dB
Übersprechdämpfung (Aux, 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	420 mV/330 Ω
Lautsprecherimpedanz	
MAIN	8 Ω ~ 16 Ω
RAUMKLANGREGLER	8 Ω ~ 16 Ω

■ ALLGEMEINE DATEN

Leistungsaufnahme	205 W
Netzspannung	
Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110 V/127 V/220 V/240 V
Abmessungen (B×H×T)	315 × 99 × 246 mm
Gewicht	4,5 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

(Die technischen Daten können infolge von Verbesserungen ohne Ankündigung geändert werden.)

FRANÇAIS

CARACTERISTIQUES

(DIN 45 500)

SECTION AMPLIFICATEUR

Puissance de sortie continue de 40 Hz~20 kHz, les deux canaux en circuit	2 × 35W (8Ω)
Puissance de sortie continue à 1 kHz les deux canaux en circuit	2 × 42W (8Ω)
Distorsion harmonique totale	
à puissance nominale (40 Hz~20 kHz)	0,05% (8Ω)
à demi-puissance (20 Hz~20 kHz)	0,05% (8Ω)
à demi-puissance (1 kHz)	0,005% (8Ω)
Distorsion d'intermodulation	
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,05%
Réponse de fréquences	
les deux canaux en circuit, −3 dB	10 Hz~25 kHz (8Ω)
Coefficient d'amortissement	40 (8Ω)
Sensibilité et impédance d'entrée	
PHONO	2,5 mV/47kΩ
SYNTONISATEUR, AUX, CD, VTR (TUNER, AUX, CD, VTR)	150 mV/22kΩ
BANDE (TAPE)	150 mV/22kΩ
MICRO (MIC)	1,5 mV/10kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS)	150 mV
MIC (tension d'entrée maximum, 1 kHz RMS)	75 mV
Signal/Bruit	
à puissance nominale (8Ω)	
PHONO	71 dB (IHF, A: 72 dB)
SYNTONISATEUR, AUX, BANDE, CD, VTR (TUNER, AUX, TAPE, CD, VTR)	84 dB (IHF, A: 84 dB)
Réponse de fréquence	
PHONO	Courbe nominale RIAA ±0,8 dB (30 Hz~15 kHz)
SYNTONISATEUR, AUX, BANDE, CD, VTR (TUNER, AUX, TAPE, CD, VTR)	10 Hz~70 kHz (−3 dB)
Compensateur de fréquences/fréquence d'analyseur de spectre	80 Hz, 250 Hz, 1 kHz, 4 kHz, 12,5 kHz
Portée de variation du compensateur de éfréquences	±10 dB
Portée dynamique du compensateur de fréquences	30 dB
Tension de sortie	
SORTIE ENREGISTREMENT (REC OUT)	150 mV
Equilibrage des canaux, AUX 250 Hz~6 300 Hz	±1,0 dB
Séparation des canaux, AUX 1 kHz	55 dB
Niveau de sortie des casques et impédance	420 mV/330Ω
Impédance de charge	
PRINCIPALE (MAIN)	8Ω~16Ω
SON AMBIANT	8Ω~16Ω

DIVERS

Consommation	205W
Alimentation	
Pour l'Europe	CA 50 Hz/60 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/127V/220V/240V
Dimensions (L×H×Pr)	315 × 99 × 246 mm
Poids	4,5 kg

Remarques:

1. La Société NATIONAL-PANASONIC-FRANCE, importateur du matériel MATSUSHITA-ELECTRIC déclare que cet appareil est conforme aux prescriptions de la directive 76/889/C.E.E. (arrêté 14 Janvier 1980).
2. On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

(Sujet à changement sans préavis)

ESPAÑOL

■ ESPECIFICACIONES

(DIN 45 500)

■ SECCION AMPLIFICADOR

Potencia continua de 40 Hz~20 kHz	
en ambos canales	2 × 35W (8Ω)
Potencia continua de 1 kHz	
en ambos canales	2 × 42W (8Ω)
Distorsión armónica total	
potencia de régimen a 40 Hz~20 kHz	0,05% (8Ω)
mitad de potencia a 20 Hz~20 kHz	0,05% (8Ω)
mitad de potencia a 1 kHz	0,005% (8Ω)
Distorsión por intermodulación	
potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,05%
Ancho de banda de potencia	
con ambos canales, −3 dB	10 Hz~25 kHz (8Ω)
Factor de amortiguamiento	40 (8Ω)
Sensibilidad e impedancia de entrada	
TOCADISC. (PHONO)	2,5 mV/47kΩ
SINTON., AUX., CD, VTR (TUNER, AUX, CD, VTR)	150 mV/22kΩ
GRAB. (TAPE)	150 mV/22kΩ
MIC. (MIC)	1,5 mV/10kΩ
Voltaje máximo de entrada de PHONO (1 kHz, RMS)	150 mV
Voltaje máximo de entrada de MIC (1 kHz, RMS)	75 mV
Relación de señal a ruido	
potencia de régimen (8Ω)	
TOCADISC. (PHONO)	71 dB (IHF, A: 72 dB)
SINTON., AUX., GRAB., CD, VTR (TUNER, AUX, TAPE, CD, VTR)	84 dB (IHF, A: 84 dB)
Respuesta de frecuencia	
TOCADISC. (PHONO)	curva RIAA estándar ±0,8 dB (30 Hz~15 kHz)
SINTON., AUX., GRAB., CD, VTR (TUNER, AUX, TAPE, CD, VTR)	10 Hz~70 kHz (−3 dB)
Frecuencia del igualador y del analizador de espectro	80 Hz, 250 Hz, 1 kHz, 4 kHz, 12,5 kHz
Intervalo de variación del igualador	±10 dB
Gama dinámica del analizador de espectro	30 dB
Voltaje de salida	
SAL. GRAB. (REC OUT)	150 mV
Equilibrio de canales, AUX 250 Hz~6 300 Hz	±1,0 dB
Separación de canales, AUX 1 kHz	55 dB
Impedancia y nivel de salida de los auriculares	420 mV/330Ω
Impedancia de carga	
MAIN	8Ω~16Ω
SONIDO ENVOLVENTE	8Ω~16Ω

■ GENERAL

Consumo de energía	205W
Alimentación de energía	
Para Europa continental	CA 50 Hz/60 Hz, 220V
Para otros paises	CA 50 Hz/60 Hz, 110V/127V/220V/240V
Dimensiones (An.×Al.×Prof.)	315 × 99 × 246 mm
Peso	4,5 kg

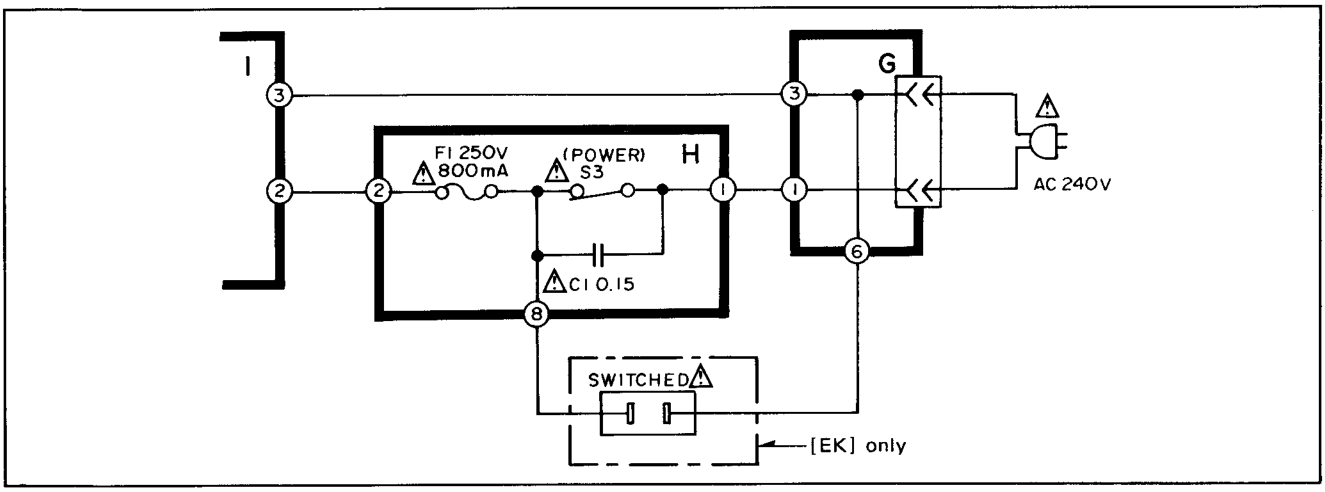
Nota:
La distorsión armónica total se mide con el analizador de espectro digital (sistema H.P. 3045).

(Estas especificaciones están sujetas a cualquier cambio sin previo eviso.)

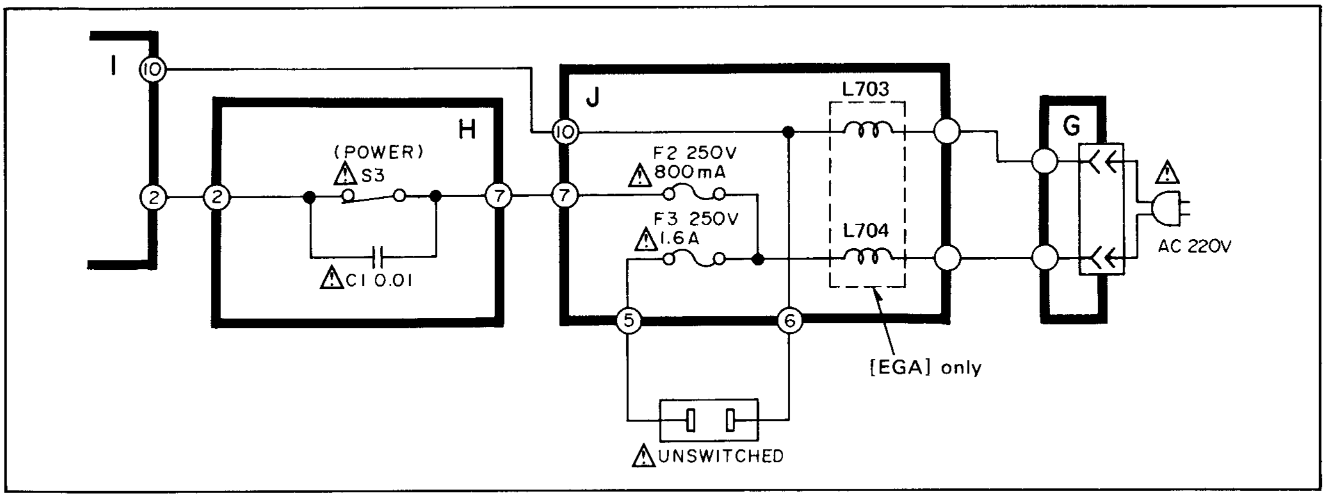
■ CIRCUITS TO BE CHANGED AND THE AREAS

- **Power supply circuits**

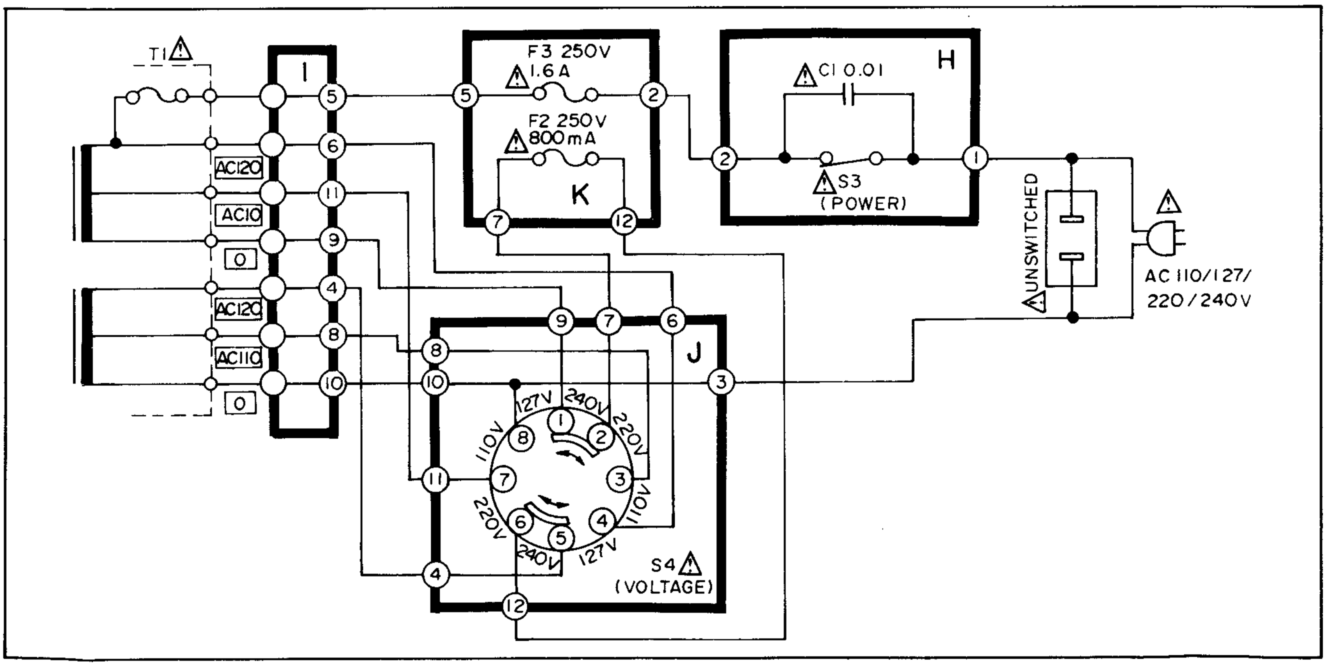
For [EK] and [XL] areas [XL]..... Australia, [EK]..... United Kingdom


I
③
②
G
③
①
⑥
F1 250V
⚠800mA
(POWER)
⚠ S3
H
②
①
⚠C1 0.15
⑧
⚠
AC 240V
SWITCHED⚠
[EK] only

For [EW] and [EGA] areas [EW]..... Switzerland, [EGA].... F.R. Germany


I
⑩
②
H
(POWER)
⚠S3
②
⑦
⚠C1 0.01
J
⑩
⑦
F2 250V
⚠800mA
F3 250V
⚠1.6A
L703
L704
⑤
⑥
G
⚠
AC 220V
[EGA] only
⚠UNSWITCHED

For [XA] area [XA]..... Asia, Oceania, Africa, Middle Near East and Latin America


T1⚠
I
⑤
⑥
⑪
⑨
④
⑧
⑩
AC120
AC10
0
AC120
AC110
0
F3 250V
⚠1.6A
F2 250V
⚠800mA
K
⑤
②
⑦
⑫
⚠C1 0.01
H
②
①
⚠S3
(POWER)
⚠UNSWITCHED
⚠
AC 110/127/
220/240V
J
⑨
⑦
⑥
⑧
⑩
③
⑪
④
⑫
127V
240V
220V
110V
110V
220V
240V
127V
S4⚠
(VOLTAGE)

Printed in Japan
850404100 Ⓗ YK

■ HOW TO OPERATE

① **Power: "on" (▆→▂)**
Be sure to reduce the volume level to the minimum ("0") position before turning on the power.

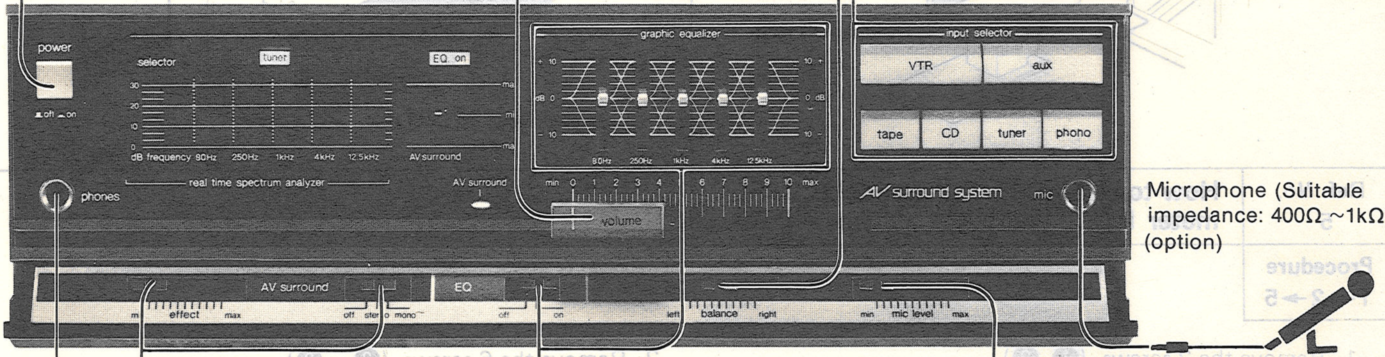
③ **Follow the instructions accompanying your equipment for set up and operation of the selected sound source.**

④ **Adjust the volume level.**

② **Select the sound source.**

VTR: Press this button to listen to equipment connected to the "VTR" terminals.
aux: Press this button to listen to equipment connected to the "AUX" terminals.
tape: Press this button to listen to tape.
CD: Press this button to listen to a compact disc player.
tuner: Press this button to listen to radio broadcasts.
phono: Press this button to listen to phono discs.

Adjust left/right volume balance.

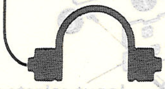

power
off on
selector
tuner
EQ on
30
20
10
0
dB frequency 60Hz 250Hz 1kHz 4kHz 12.5kHz
real time spectrum analyzer
AV surround
phones
graphic equalizer
10
0 dB
10
80Hz 250Hz 1kHz 4kHz 12.5kHz
min 0 1 2 3 4 5 6 7 8 9 10 max
volume
input selector
VTR
aux
tape
CD
tuner
phono
AV surround system
mic
AV surround
min effect max
off stereo mono
EQ
off on
left balance right
min mic level max

Microphone (Suitable impedance: 400Ω ~1kΩ) (option)

These are used when the surround-sound effect is desired.

These are used when the graphic equalizer is to be used.

When listening through headphones



Headphones (option)

Sound from the speakers will not be heard when headphones are connected to this jack.

Note:
Set volume control to minimum ("0") position before connecting headphones.

Microphone mixing

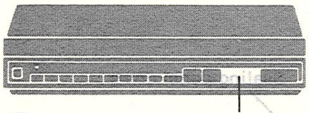
① **Connect the microphone.**
② **Begin the sound source (disc, tape, etc.).**
③ **Adjust the microphone volume level.**

Notes:
1. Before making connections, be sure to set the microphone volume control to the minimum ("0") position.
2. Disconnect the microphone when not in use.
3. If the microphone volume level is increased while the microphone is being used, a "howling" noise may be heard. If so, change the position or direction of the microphone, or reduce the microphone volume level.

Direct operation

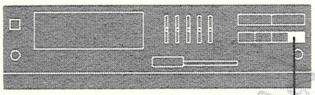
The direct operation function is a convenient feature which makes it possible to automatically switch the amplifier's input selectors from any of the various connected components (record player, tuner, tape deck).

■ To listen to phono discs



Turntable (option)

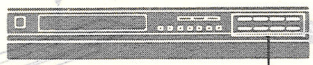
Press the "start" button.



This unit

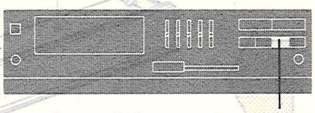
The "phono" button is selected automatically.

■ To listen to radio broadcasts



Tuner (option)

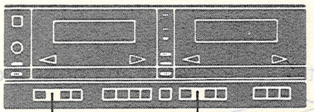
Press one of the preset-tuning buttons.



This unit

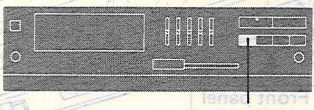
The "tuner" button is selected automatically.

■ To listen to tapes



Tape deck (option)

Press the "play" button.



This unit

The "tape" button is selected automatically.

Notes: 1. Do not switch the tuner on while playing a disc or tape, or while tape recording, because to do so will cause the "tuner" input selector to be automatically activated.

2. This feature cannot be used for a tuner or tape deck which does not have direct connectors, or for a record player which does not have a synchro recording terminal.

■ HOW TO OPERATE

❶ Power: "on" (▪→▴)
Be sure to reduce the volume level to the minimum ("0") position before turning on the power.

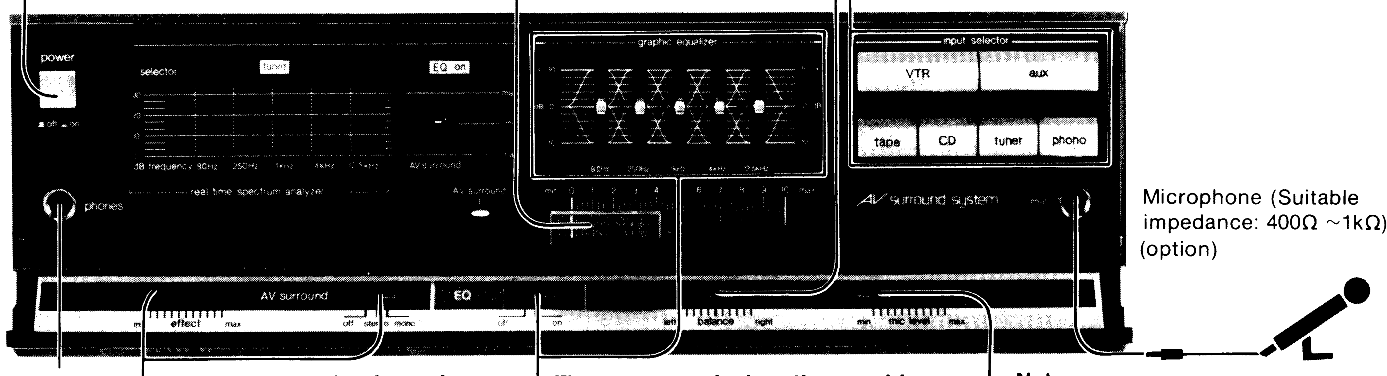
❸ Follow the instructions accompanying your equipment for set up and operation of the selected sound source.

❹ Adjust the volume level.

❷ Select the sound source.

VTR: Press this button to listen to equipment connected to the "VTR" terminals.
aux: Press this button to listen to equipment connected to the "AUX" terminals.
tape: Press this button to listen to tape.
CD: Press this button to listen to a compact disc player.
tuner: Press this button to listen to radio broadcasts.
phono: Press this button to listen to phono discs.

Adjust left/right volume balance.


power
off on
selector
tuner
EQ on
phones
real time spectrum analyzer
graphic equalizer
input selector
VTR
aux
tape
CD
tuner
phono
AV surround system
AV surround
effect
max
off
stereo
mono
EQ
on
left
balance
right
min
mic level
max

Microphone (Suitable impedance: 400Ω ~1kΩ) (option)

These are used when the surround-sound effect is desired.

These are used when the graphic equalizer is to be used.

When listening through headphones

Headphones (option)

Sound from the speakers will not be heard when headphones are connected to this jack.

Note:
Set volume control to minimum ("0") position before connecting headphones.

Microphone mixing

① **Connect the microphone.**
② **Begin the sound source (disc, tape, etc.).**
③ **Adjust the microphone volume level.**

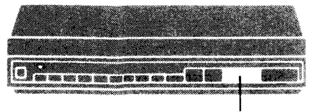
Notes:

1. Before making connections, be sure to set the microphone volume control to the minimum ("0") position.
2. Disconnect the microphone when not in use.
3. If the microphone volume level is increased while the microphone is being used, a "howling" noise may be heard. If so, change the position or direction of the microphone, or reduce the microphone volume level.

Direct operation

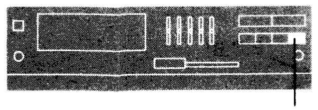
The direct operation function is a convenient feature which makes it possible to automatically switch the amplifier's input selectors from any of the various connected components (record player, tuner, tape deck).

■ To listen to phono discs



Turntable (option)

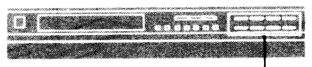
Press the "start" button.



This unit

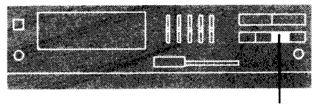
The "phono" button is selected automatically.

■ To listen to radio broadcasts



Tuner (option)

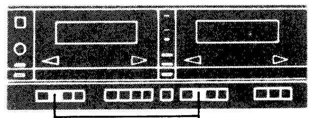
Press one of the preset-tuning buttons.



This unit

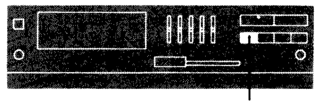
The "tuner" button is selected automatically.

■ To listen to tapes



Tape deck (option)

Press the "play" button.



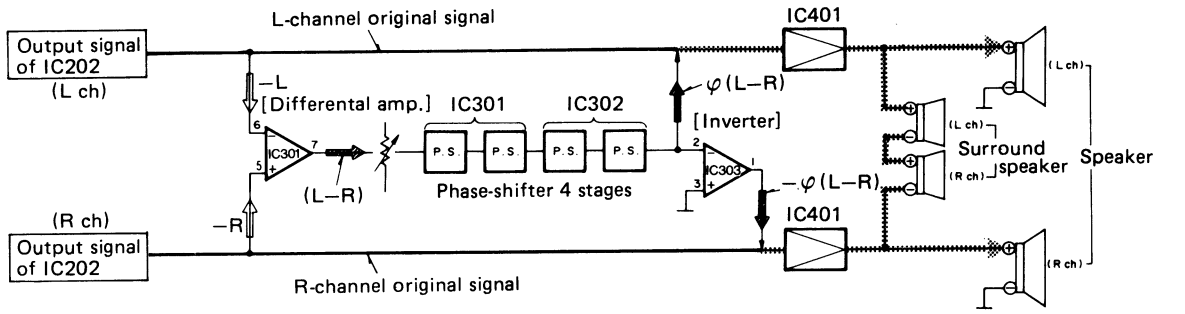
This unit

The "tape" button is selected automatically.

Notes:
1. Do not switch the tuner on while playing a disc or tape, or while tape recording, because to do so will cause the "tuner" input selector to be automatically activated.
2. This feature cannot be used for a tuner or tape deck which does not have direct connectors, or for a record player which does not have a synchro recording terminal.

■ AV SURROUND CIRCUIT

- **Block diagram**


L-channel original signal
Output signal of IC202
(L ch)
−L
[Differental amp.]
IC301
IC302
IC301
P.S.
P.S.
P.S.
P.S.
(L−R)
Phase-shifter 4 stages
φ(L−R)
[Inverter]
IC303
−φ(L−R)
IC401
IC401
(L ch)
(L ch)
Surround speaker
(R ch)
Speaker
(R ch)
(R ch)
Output signal of IC202
−R
R-channel original signal

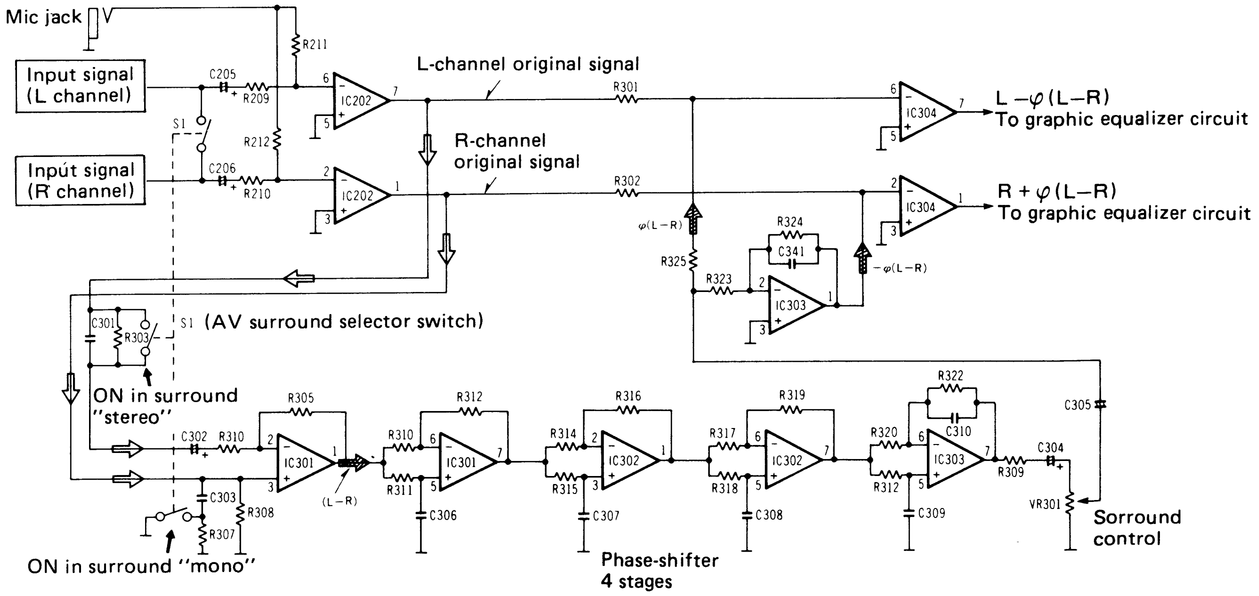
- **Circuit operation with AV surround "stereo" position.**

1. Output signal from mixing amp. (IC202) is passed through differential amp. (IC301) to make difference signal of (L−R).
2. Signal of (L−R) passes through the phase shifter of IC301 and IC302 to turn into phase-deflected signal of φ (L−R). (One OP amp. of this phase shifter circuit is capable of phase shifting by 180 deg. max.)
3. The φ (L−R) signal is applied to the original signal of L channel. The signal component output from L channel speaker is $L-\varphi(L-R)$.
4. The φ (L−R) signal is passed through the reverse amp. (IC303) to apply $-\varphi(L-R)$ to the orignal signal of R channel. The signal component output from R channel speaker is $R+\varphi(L-R)$.
5. The surrounded speaker is series-connected to the output line of R, and the difference signal between both channels is the output.
   Difference signal between both channels:

$$\begin{aligned}&= L-\varphi(L-R)-[R+\varphi(L-R)]\\&= L-R-2\varphi(L-R)\\&= (\text{Difference component of orignal signal}) + (\text{Reverberation effect}).\end{aligned}$$

- **Circuit operation with AV surround "mono" position.**

1. Output signal from L channel mixing amp. (IC202) is applied to IC301 through the low cut filter of R303 and C301.
2. Output signal from R channel mixing amp. (IC202) is applied to IC301 through the high cut filter of R307 and C303.
3. False stereo signal thus produced is taken out of IC301 as (L−R) signal.
4. After that, the signal is processed the same as for the above-mentioned "stereo" position.


Mic jack
R211
Input signal (L channel)
C205
R209
S1
R212
Input signal (R channel)
C206
R210
IC202
IC202
L-channel original signal
R-channel original signal
R301
R302
IC304
IC304
L −φ(L−R)
To graphic equalizer circuit
R + φ(L−R)
To graphic equalizer circuit
φ(L−R)
R325
R324
C341
R323
IC303
−φ(L−R)
C301
R303
S1 (AV surround selector switch)
ON in surround "stereo"
C302
R310
R305
IC301
C303
R308
R307
ON in surround "mono"
(L−R)
R312
R310
R311
IC301
C306
R316
R314
R315
IC302
C307
R319
R317
R318
IC302
C308
R322
R320
C310
R312
IC303
C309
R309
C304
C305
VR301
Sorround control
Phase-shifter 4 stages

■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of this unit is used.

If this occurs, follow the procedure outlines below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again.

> **Note**
> When the protection circuitry functions, the unit will not operate unless the power is first turned off and then on again.

■ BEFORE REPAIR AND ADJUSTMENT

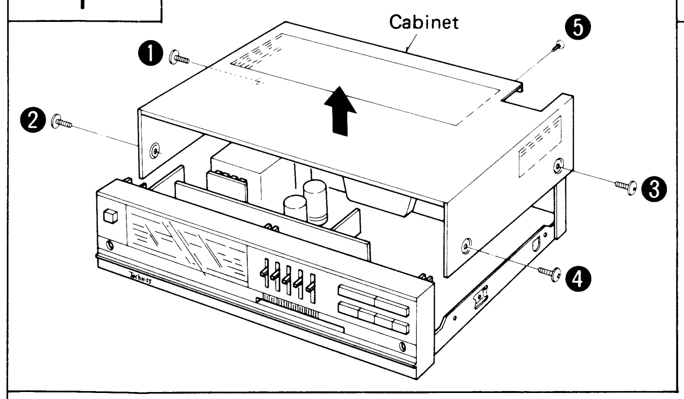
1. Disconnect AC power, Discharge both Power Supply Capacitors C602 and C603 (4700μF) through a 10Ω, 5W resistor to ground.
   DO NOT SHORT-CIRCUIT DIRECTLY (with a screwdriver blade, for instance), as this may distroy solid state devices.
2. After repairs are completed, restore power gradually using a variac, to avoid overcurrent.
   Cuttent consumption at 50/60 Hz in NO SIGNAL mode should be shown below with respect to supply voltage 110V/127V/220V/240V.

Power supply voltage		AC 110V	AC 127V	AC 220V	AC 240V
Consumed current	50 Hz	135 ~ 420mA	125 ~ 385mA	70 ~ 215mA	60 ~ 175mA
	60 Hz	130 ~ 405mA	120 ~ 370mA	65 ~ 205mA	60 ~ 185mA

■ DISASSEMBLY INSTRUCTIONS

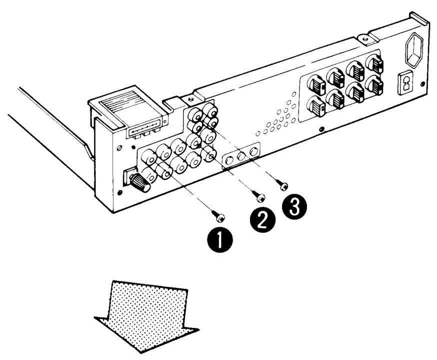
Ref. No. 1	How to remove the cabinet
Procedure 1	

1. Remove the 5 screws (❶ ~ ❺).

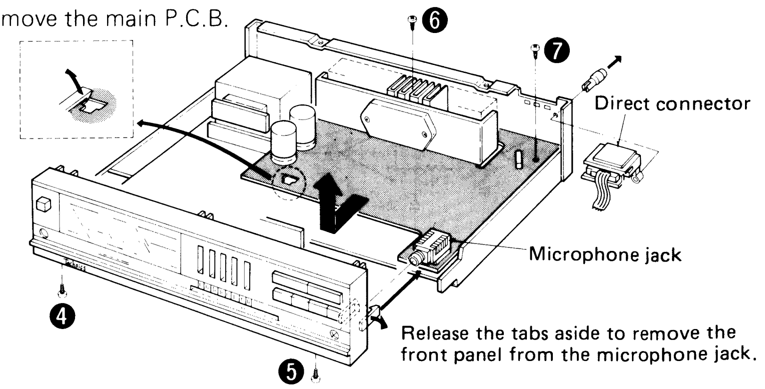


Ref. No. 2	How to remove the main P.C.B.
Procedure 1 → 2	

1. Remove the 3 screws (❶ ~ ❸).



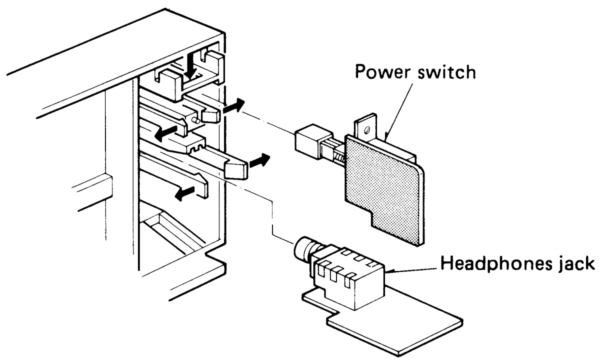
2. Remove the 2 screws (❹, ❺) to remove the front panel.
3. Remove the direct connector.
4. Remove the 2 screws (❻, ❼) to remove the main P.C.B.



Release the tabs aside to remove the front panel from the microphone jack.

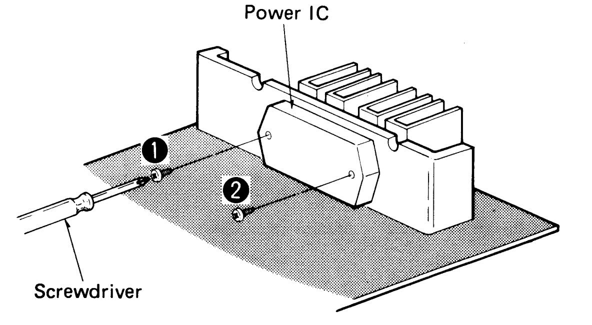
Ref. No. 3	How to remove the headphones jack and power switch
Procedure 1 → 2 → 3	

1. Release the tabs aside to remove the front panel from the headphones jack.



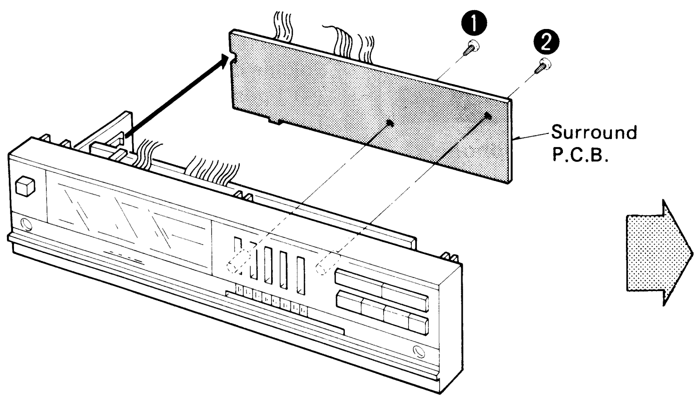
Ref. No. 4	How to remove the power IC
Procedure 1 → 2 → 4	

1. Unsolder the power IC.
2. Remove the 2 screws (❶, ❷).
   - When mounting the power amplifier IC, apply silicon compound (SZZ0L15) to the rear of the power amplifier IC.

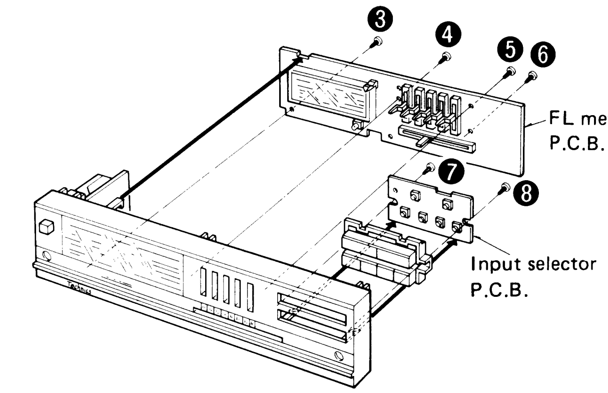


Ref. No. 5	How to remove the surround P.C.B. FL meter P.C.B. and input selector P.C.B.
Procedure 1 → 2 → 5	

1. Remove the 2 screws (❶, ❷).

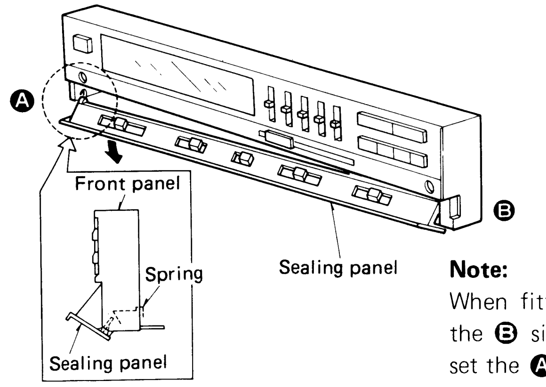


2. Remove the 6 screws (❸ ~ ❽).

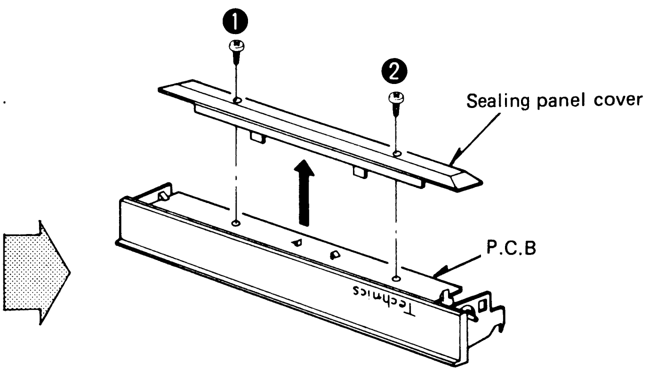


Ref. No. 6	How to remove the sealing panel and P.C.B.
Procedure 6	

1. Remove the sealing panel and press it down at side Ⓐ.

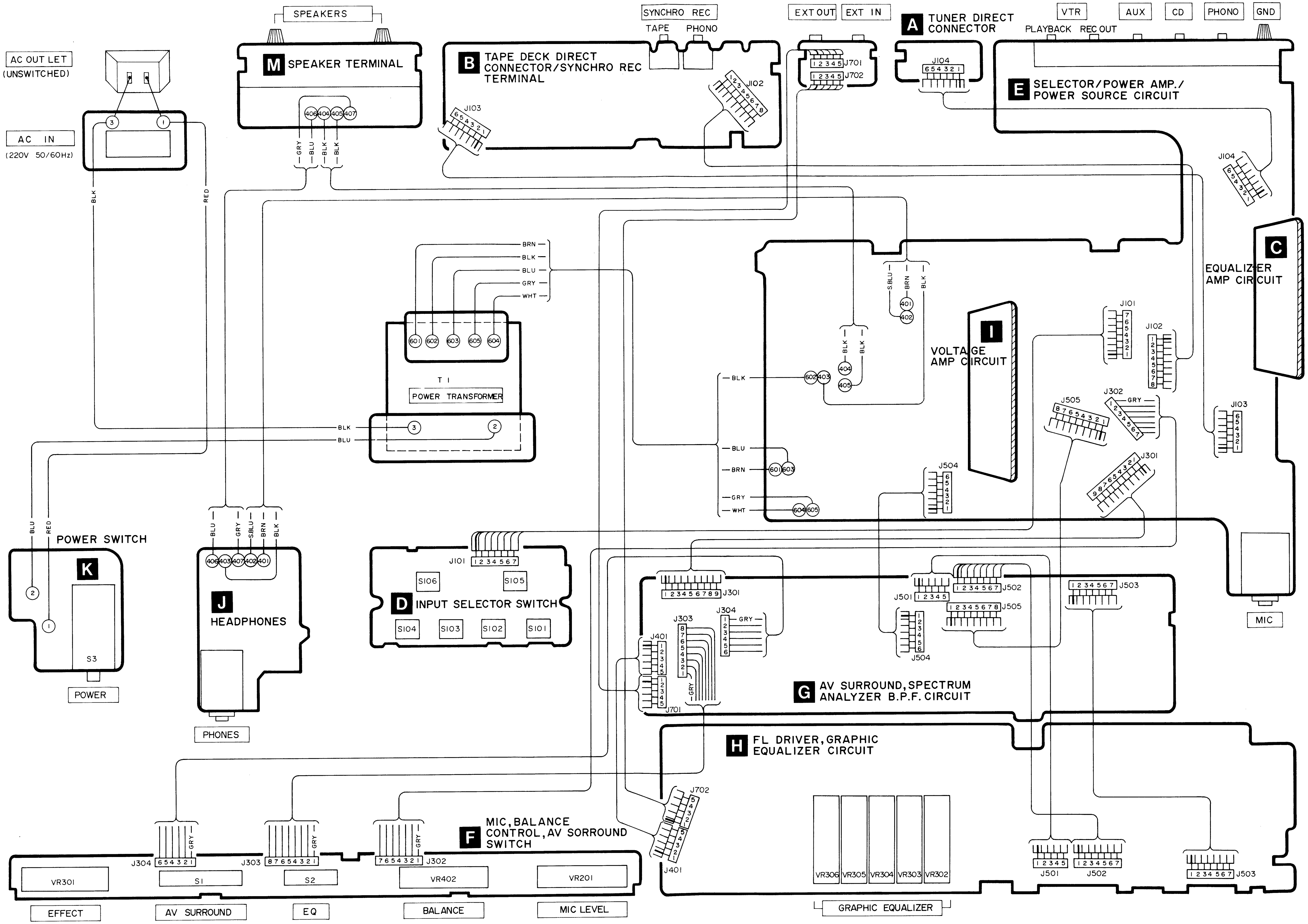


2. Remove the 2 screws (❶, ❷) to remove the P.C.B.



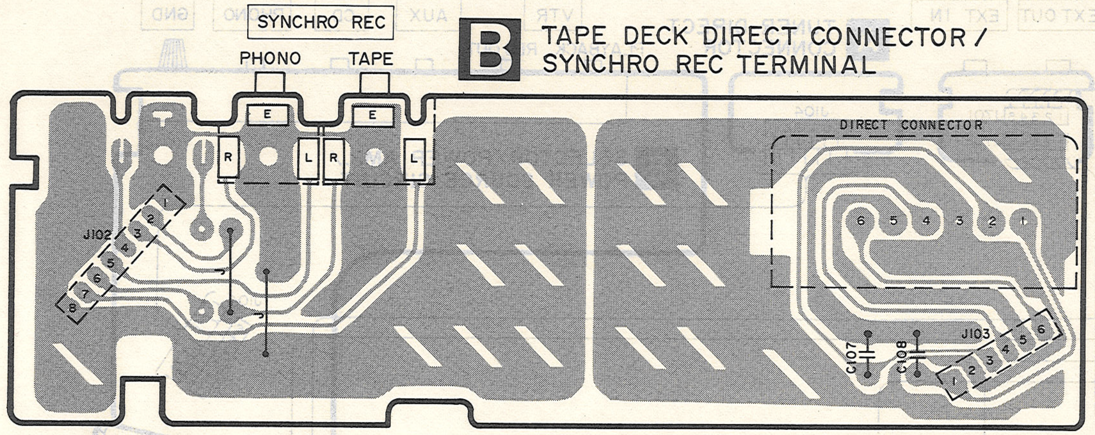
Note:
When fitting the sealing panel, remove the sealing panel cover, and first set the Ⓑ side and make sure the spring is in contact with the sealing panel, then set the Ⓐ side.

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

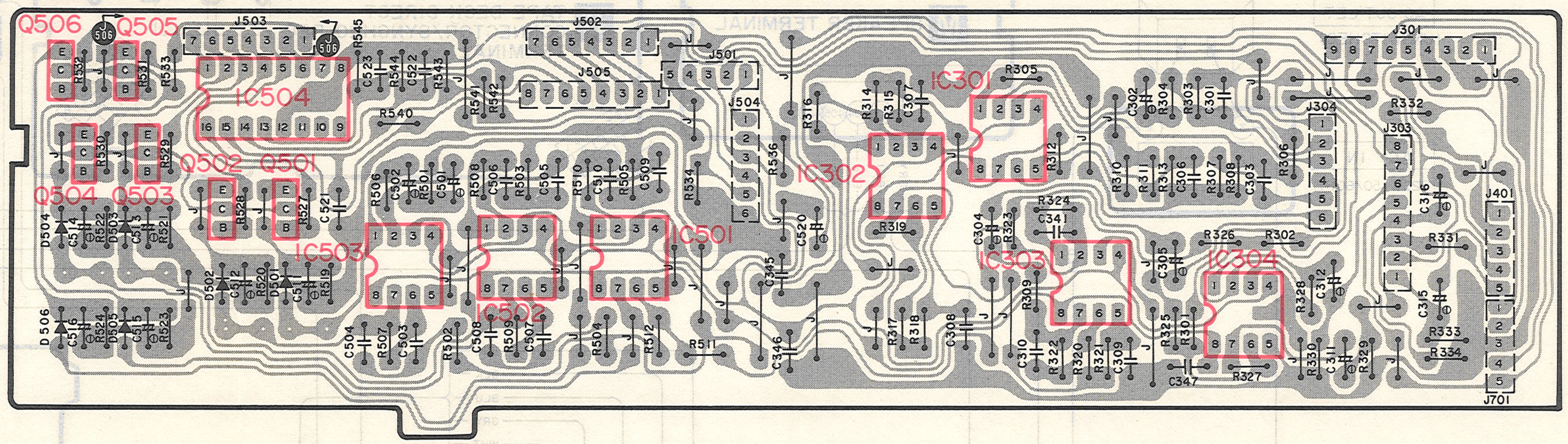

SPEAKERS
SYNCHRO REC
TAPE
PHONO
EXT OUT
EXT IN
A TUNER DIRECT CONNECTOR
VTR
PLAYBACK
REC OUT
AUX
CD
PHONO
GND
AC OUT LET (UNSWITCHED)
AC IN (220V 50/60Hz)
M SPEAKER TERMINAL
B TAPE DECK DIRECT CONNECTOR/SYNCHRO REC TERMINAL
E SELECTOR/POWER AMP./POWER SOURCE CIRCUIT
J701
J702
J102
J103
J104
C EQUALIZER AMP CIRCUIT
J101
J102
J103
T1 POWER TRANSFORMER
601 602 603 605 604
BRN
BLK
BLU
GRY
WHT
RED
S.BLU
I VOLTAGE AMP CIRCUIT
J505
J302
J301
J504
MIC
K POWER SWITCH
S3
POWER
J HEADPHONES
PHONES
406 403 407 402 401
404 405
D INPUT SELECTOR SWITCH
J101
S106
S105
S104
S103
S102
S101
G AV SURROUND, SPECTRUM ANALYZER B.P.F. CIRCUIT
J301
J501
J502
J505
J503
J304
J303
J401
J701
J504
H FL DRIVER, GRAPHIC EQUALIZER CIRCUIT
J702
J401
VR306 VR305 VR304 VR303 VR302
J501
J502
J503
GRAPHIC EQUALIZER
F MIC, BALANCE CONTROL, AV SORROUND SWITCH
J304
J303
J302
VR301
S1
S2
VR402
VR201
EFFECT
AV SURROUND
EQ
BALANCE
MIC LEVEL

■ PRINTED CIRCUIT BOARDS

B TAPE DECK DIRECT CONNECTOR / SYNCHRO REC TERMINAL

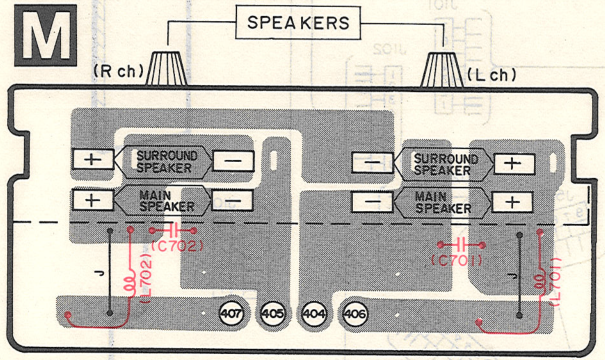

SYNCHRO REC
PHONO
TAPE
E
R
L
J102
DIRECT CONNECTOR
6 5 4 3 2 1
J103
C107
C108

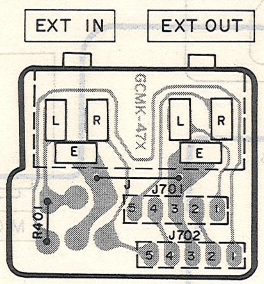
G AV SURROUND, SPECTRUM ANALIZER B.P.F. CIRCUIT


Q506
Q505
J503
J502
J501
J505
J504
IC504
Q502
Q501
Q504
Q503
IC503
IC502
IC501
IC301
IC302
IC303
IC304
J301
J304
J303
J401
J701
R305
R332
R331
R333
R334
R302
R324
C341
C347
R327
D504
D506
D502

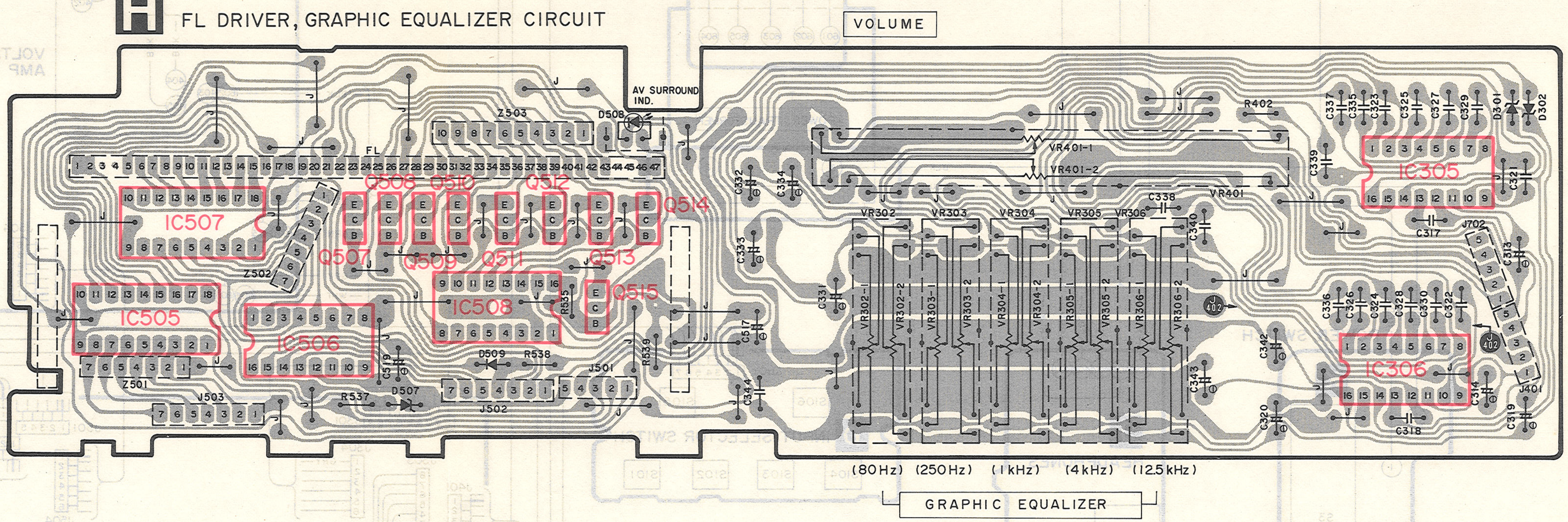
SPEAKER TERMINAL

M

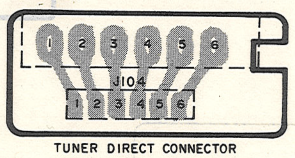

SPEAKERS
(R ch)
(L ch)
SURROUND SPEAKER
MAIN SPEAKER
+
−
(C702)
(C701)
(L702)
(L701)
407
405
404
406


EXT IN
EXT OUT
GCMK-47X
L
R
E
J701
J702
R401
5 4 3 2 1

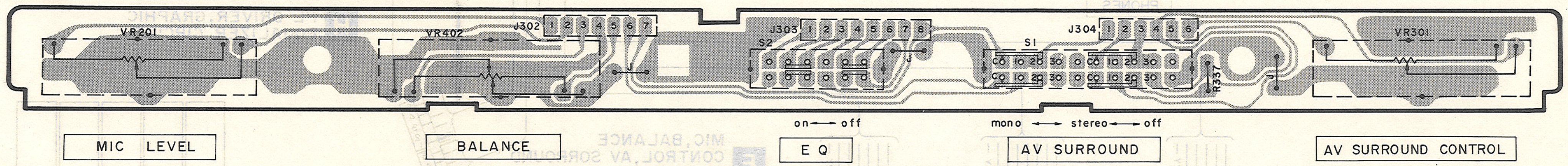
H FL DRIVER, GRAPHIC EQUALIZER CIRCUIT

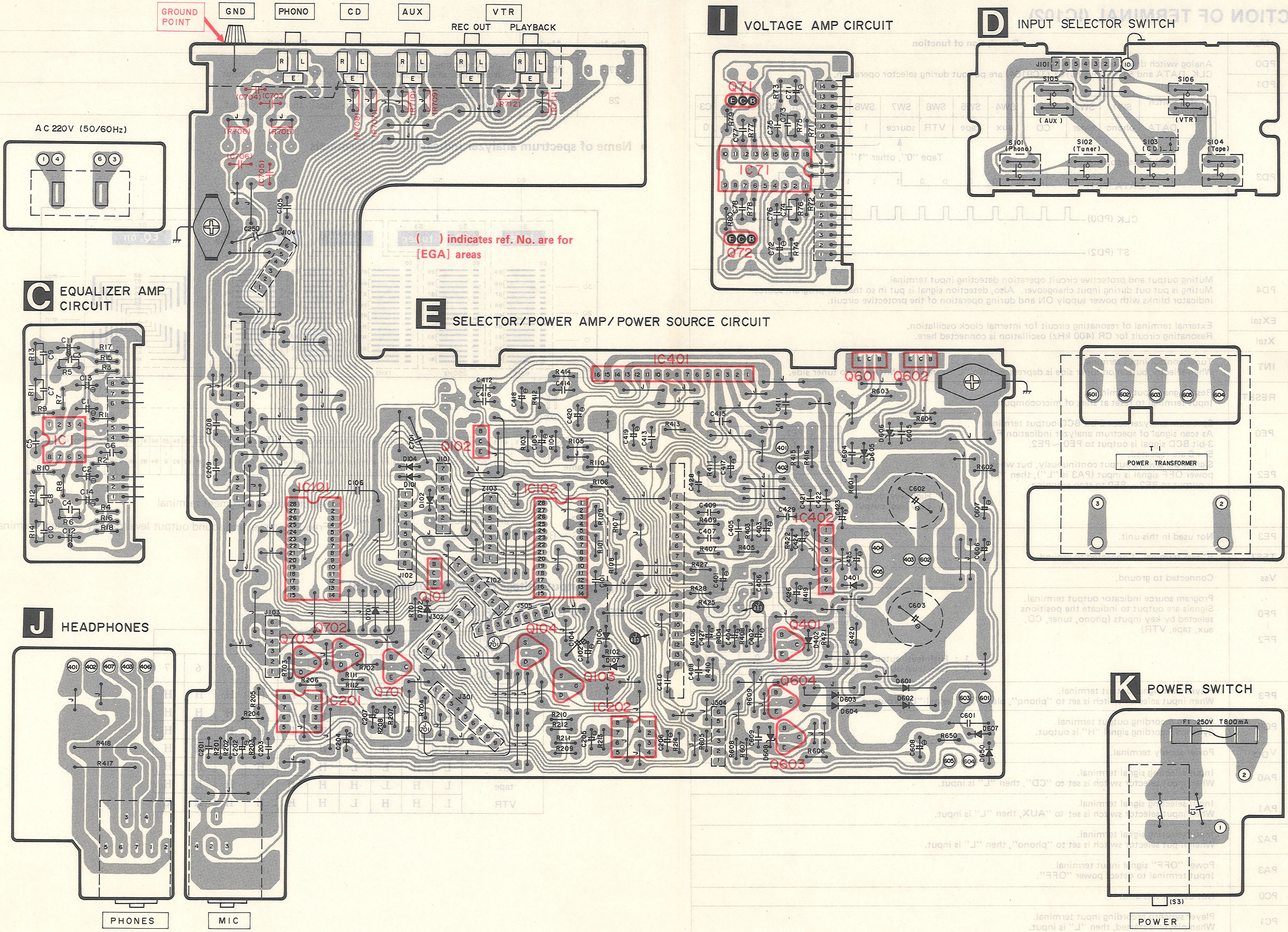

VOLUME
AV SURROUND IND.
D508
Z503
FL
R402
VR401-1
VR401-2
VR401
IC507
Q508
Q510
Q512
Q514
Q507
Q509
Q511
Q513
Q515
IC505
IC506
IC508
IC305
IC306
Z502
Z501
J503
J502
J501
J702
J401
D509
D507
R537
R538
D301
D302
VR302
VR303
VR304
VR305
VR306
C338
C317
C318
(80Hz)
(250Hz)
(1kHz)
(4kHz)
(12.5kHz)
GRAPHIC EQUALIZER

A TUNER DIRECT CONNECTOR


1 2 3 4 5 6
J104
TUNER DIRECT CONNECTOR

F MIC, BALANCE CONTROL, AV SURROUND SWITCH


VR201
VR402
J302
J303
S2
S1
J304
R337
VR301
on ←→ off
mono ←→ stereo ←→ off
MIC LEVEL
BALANCE
E Q
AV SURROUND
AV SURROUND CONTROL


GROUND POINT
GND
PHONO
CD
AUX
VTR
REC OUT
PLAYBACK
AC 220V (50/60Hz)
C EQUALIZER AMP CIRCUIT
IC1
J HEADPHONES
PHONES
MIC
I VOLTAGE AMP CIRCUIT
Q71
Q72
IC71
D INPUT SELECTOR SWITCH
J101
S105 (AUX)
S106 (VTR)
S101 (Phono)
S102 (Tuner)
S103 (CD)
S104 (Tape)
E SELECTOR/POWER AMP/POWER SOURCE CIRCUIT
IC101
IC102
IC201
IC202
IC401
IC402
Q101
Q102
Q103
Q104
Q401
Q601
Q602
Q603
Q604
Q701
Q702
Q703
POWER TRANSFORMER
K POWER SWITCH
F1 250V T800mA
(S3)
POWER

( ) indicates ref. No. are for [EGA] areas

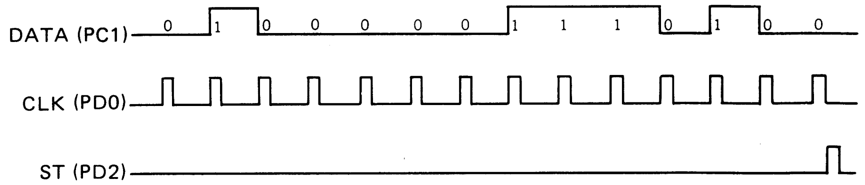
■ FUNCTION OF TERMINAL (IC102)

Pin No.	Mark	Description of function
1	PD0	Analog switch driver output terminal. CLK, DATA and ST to drive IC101 (TC9164) are put out during selector operation.
2	PD1	
3	PD3	

Analog switch of IC101	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	L ch.	R ch.	C0	C1	C2	C3
DATA	phono	tuner	CD	aux	tape	VTR	source	1	1	1	0	1	0	0

Tape "0", other "1"   Fixed

(Ex.) Tuner position



Pin No.	Mark	Description of function
4	PD4	Muting output and protective circuit operation detecting input terminal. Muting is put out during input changeover. Also, detection signal is put in so that the program source indicator blinks with power supply ON and during operation of the protective circuit.
5	EXtal	External terminal of resonating circuit for internal clock oscillation. Resonating circuit for CR (400 kHz) oscillation is connected here.
6	Xtal	
7	INT	Tuner control input terminal. When selector button on tuner side is depressed, then "L" is input to shift input to tuner side.
8	RESET	Reset signal input terminal. Input terminal to reset at start of microcomputer.
9 ≀ 11	PE0 ≀ PE2	Spectrum analyzer scan 3-bit BCD output terminal As scan signal of spectrum analyzer indication FL, 3-bit BCD signal is output to PE0 ~ PE2. 5 ~ 0 are repeated. Signals are always output continuously, but when power OFF signal is input (PA3 is "L"), then "111" is output to PE2 ~ PE0 to stop scanning.

	PE2	PE1	PE0
0	1	0	1
1	1	0	0
2	0	1	1
3	0	1	0
4	0	0	1
5	0	0	0

1 : High level output
0 : Low level output

Pin No.	Mark	Description of function
12	PE3	Not used in this unit.
13	TEST	IC test terminal. Connected to ground.
14	Vss	Connected to ground.
15 ≀ 17	PF0 ≀ PF2	Program source indicator output terminal. Signals are output to indicate the positions selected by key inputs (phono, tuner, CD, aux, tape, VTR)

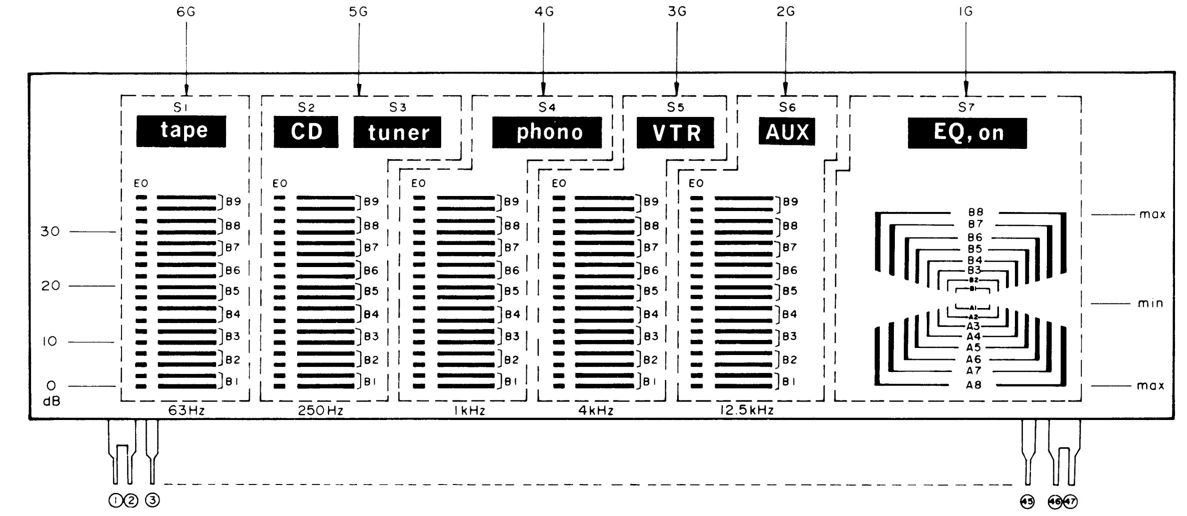
	PF2	PF1	PF0
phono	0	0	1
tuner	0	1	0
CD	0	1	1
aux	1	0	0
tape	1	0	1
VTR	1	1	0

1 : High level output
0 : Low level output

Pin No.	Mark	Description of function
18	PF3	Player start signal output terminal. When input selector switch is set to "phono", player start signal "L" is output.
19	PG0	Synchro recording output terminal. Synchro recording signal "H" is output.
20	V_{DD}	Power supply terminal.
21	PA0	Input selecting signal terminal. When input selector switch is set to "CD", then "L" is input.
22	PA1	Input selecting signal terminal. When input selector switch is set to "AUX, then "L" is input.
23	PA2	Input selecting signal terminal. When input selector switch is set to "phono", then "L" is input.
24	PA3	Power "OFF" signal input terminal. Input terminal to detect power "OFF".
25	PC0	Not used in this unit.
26	PC1	Player synchro recording input terminal. When player is started, then "L" is input.

Pin No.	Mark	Description of function
27	PC2	Input selecting signal terminal. When input selector switch is set to "VTR", then "L" is input.
28	PC3	Input selecting signal terminal. When input selector switch is set to "tape". then "L" is input.

- **Name of spectrum analyzer indication (FL) terminals**



Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Terminal name	F	F	NP	NP	6G	S1	S2	6G	S3	5G	S4	S5	5G	S6	S7	4G	EO	EO	4G	A8	3G	A7	A6	3G

Pin No.	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Terminal name	A5	A4	2G	A3	2G	A2	A1	B1	B2	B3	1G	B4	B5	B6	1G	B7	B8	B9	1G	NP	NP	F	F

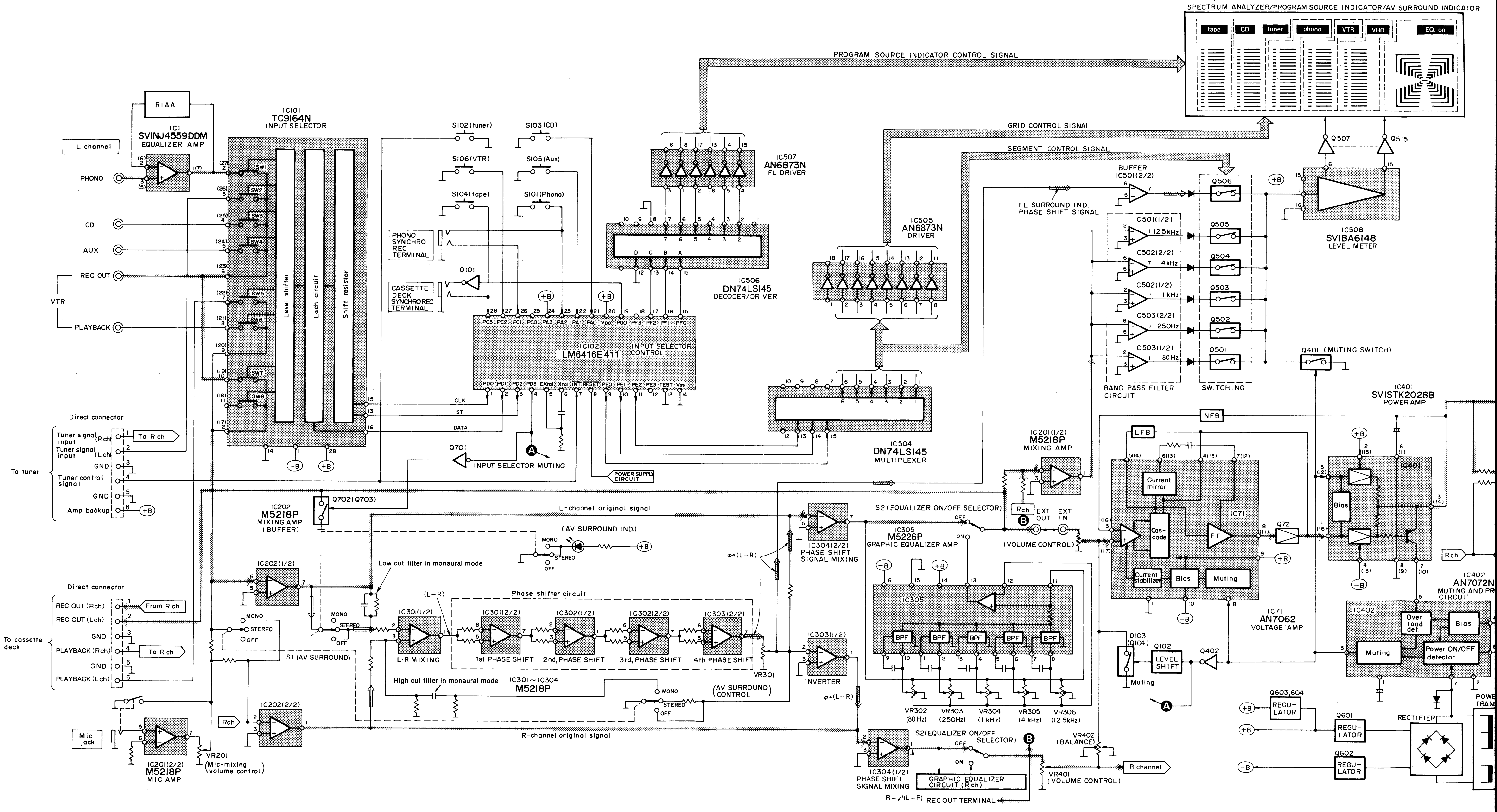
F	: Filament	S1 ~ S7	:	Selector display segment terminal
NP	: Terminal not used	A1 ~ A8	:	Frequency level and sound output level display segment terminal
1G ~ 6G	: Grid terminal	B1 ~ B9	:	

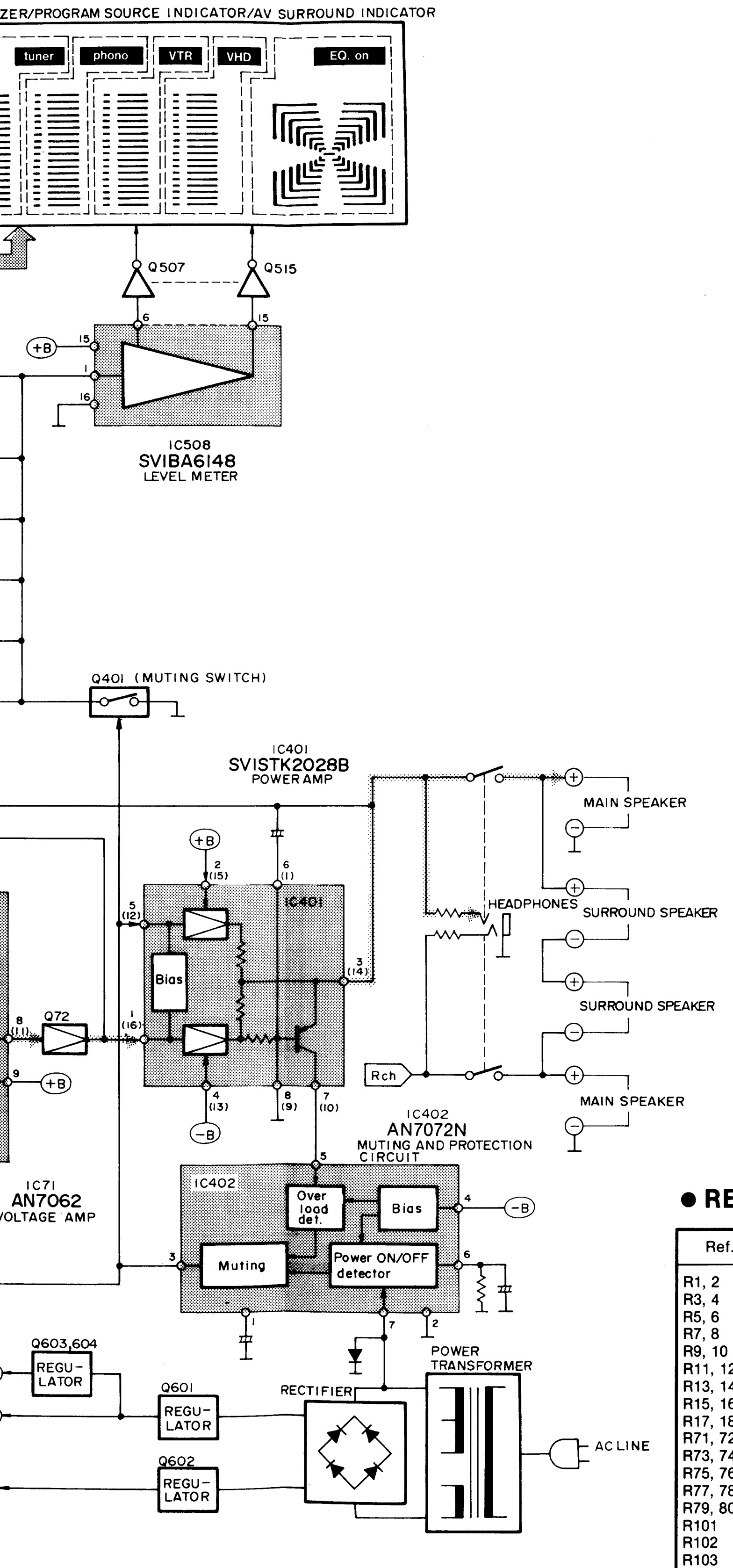
- **Input/output voltage of IC504 (DN47LS145)**

IC504 (INPUT SELECTOR IND. DRIVE)

TERMINAL / INPUT CONTROL	INPUT				OUTPUT					
	12	13	14	15	2	3	4	5	6	7
0	L	L	L	L	H	H	H	H	H	H
phono	L	L	L	H	L	H	H	H	H	H
tuner	L	L	H	L	H	L	H	H	H	H
CD	L	L	H	H	H	H	L	H	H	H
aux	L	H	L	L	H	H	H	L	H	H
tape	L	H	L	H	H	H	H	H	L	H
VTR	L	H	H	L	H	H	H	H	H	L

■ BLOCK DIAGRAM


SPECTRUM ANALYZER/PROGRAM SOURCE INDICATOR/AV SURROUND INDICATOR
tape
CD
tuner
phono
VTR
VHD
EQ. on
PROGRAM SOURCE INDICATOR CONTROL SIGNAL
GRID CONTROL SIGNAL
SEGMENT CONTROL SIGNAL
RIAA
IC1
SVINJ4559DDM
EQUALIZER AMP
L channel
PHONO
CD
AUX
REC OUT
VTR
PLAYBACK
IC101
TC9164N
INPUT SELECTOR
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
Level shifter
Lach circuit
Shift resistor
S102 (tuner)
S103 (CD)
S106 (VTR)
S105 (Aux)
S104 (tape)
S101 (Phono)
PHONO SYNCHRO REC TERMINAL
CASSETTE DECK SYNCHRO REC TERMINAL
Q101
IC102
LM6416E 411
INPUT SELECTOR CONTROL
CLK
ST
DATA
Q701
INPUT SELECTOR MUTING
POWER SUPPLY CIRCUIT
IC507
AN6873N
FL DRIVER
IC506
DN74LS145
DECODER/DRIVER
IC505
AN6873N
DRIVER
IC504
DN74LS145
MULTIPLEXER
BUFFER
IC501 (2/2)
FL SURROUND IND. PHASE SHIFT SIGNAL
IC501 (1/2) 12.5kHz
IC502 (2/2) 4kHz
IC502 (1/2) 1kHz
IC503 (2/2) 250Hz
IC503 (1/2) 80Hz
BAND PASS FILTER CIRCUIT
Q506
Q505
Q504
Q503
Q502
Q501
SWITCHING
Q507
Q515
IC508
SVIBA6148
LEVEL METER
Q401 (MUTING SWITCH)
Direct connector
Tuner signal input (Rch)
Tuner signal input (Lch)
GND
Tuner control signal
GND
Amp backup
To tuner
To Rch
IC202
M5218P
MIXING AMP (BUFFER)
Q702 (Q703)
L-channel original signal
(AV SURROUND IND.)
MONO
STEREO
OFF
Low cut filter in monaural mode
IC202 (1/2)
Direct connector
REC OUT (Rch)
REC OUT (Lch)
GND
PLAYBACK (Rch)
GND
PLAYBACK (Lch)
To cassette deck
From R ch
To R ch
S1 (AV SURROUND)
(L−R)
Phase shifter circuit
IC301 (1/2)
L-R MIXING
IC301 (2/2)
1st PHASE SHIFT
IC302 (1/2)
2nd, PHASE SHIFT
IC302 (2/2)
3rd, PHASE SHIFT
IC303 (2/2)
4th PHASE SHIFT
VR301
High cut filter in monaural mode
IC301 ~ IC304
M5218P
(AV SURROUND CONTROL)
IC202 (2/2)
Rch
R-channel original signal
Mic jack
IC201 (2/2)
M5218P
MIC AMP
VR201
(Mic-mixing volume control)
IC304 (2/2)
PHASE SHIFT SIGNAL MIXING
φ4 (L−R)
IC303 (1/2)
INVERTER
−φ4 (L−R)
IC304 (1/2)
PHASE SHIFT SIGNAL MIXING
R+φ4 (L−R)
REC OUT TERMINAL
S2 (EQUALIZER ON/OFF SELECTOR)
IC305
M5226P
GRAPHIC EQUALIZER AMP
BPF
VR302 (80Hz)
VR303 (250Hz)
VR304 (1kHz)
VR305 (4kHz)
VR306 (12.5kHz)
S2 (EQUALIZER ON/OFF SELECTOR)
GRAPHIC EQUALIZER CIRCUIT (Rch)
IC201 (1/2)
M5218P
MIXING AMP
Rch
EXT OUT
EXT IN
(VOLUME CONTROL)
LFB
NFB
Current mirror
Cas-code
E.F
IC71
Current stabilizer
Bias
Muting
IC71
AN7062
VOLTAGE AMP
Q72
Q103 (Q104)
Muting
Q102
LEVEL SHIFT
Q402
VR402 (BALANCE)
VR401 (VOLUME CONTROL)
R channel
IC401
SVISTK2028B
POWER AMP
Bias
Rch
IC402
AN7072N
MUTING AND PR CIRCUIT
Over load det.
Bias
Muting
Power ON/OFF detector
Q603, 604
REGU-LATOR
Q601
REGU-LATOR
Q602
REGU-LATOR
RECTIFIER
POWE TRAN



■ RESISTORS AND CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω (ohm). K = 1000Ω, M = 1000kΩ
5. The unit of capacitance is μF (microfarad). P = 10^{-6} μF
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

• Numbering System of Resistor

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ± 5%
ERG : Metal Oxide	S1 : 1/2W	G : ± 2%
ERO : Metal Film	S2 : 1/4W	
	10 : 1/8W	
	1 : 1W	

Chip type:
ERD10TLJ
ERG10MKG

• Numbering System of Capacitor

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic	0J : 6.3V	1H : 50V	K : ± 10%
ECCD : Ceramic	1C : 16V	KC : 400V AC	Z : +80%, −20%
ECKD : Ceramic	1E : 25V	2H : 500V	P : +100%, −0%
ECQM : Polyester	1H : 50V	D : 25V	
ECET : Polyester	42V : 42V		
ECEA.......N : Non Polar Electrolytic	50 : 50V		
ECQE : Polyester	1A : 10V		
ECFT : Semiconductor			

Color	Areas	Color	Areas
(K)	[EX] .....Continental Europe	(K)	[XA] .....Asia, Latin America, Africa, Middle Near East and Oceania
(K)	[EF] .....France		
(K)	[Ei] .....Italy		
(K)	[EK] .....United Kingdom		
(K)	[EH] .....Holland	(K)	[XL] .....Australia
(K)	[EGA]...F.R. Germany		
(K)	[EB] .....Belgium		
(K)	[EW] .....Switzerland		

• RESISTORS

Ref. No.	Part No.	Value
R1, 2	ERD10TLJ391U	390
R3, 4	ERD10TLJ224U	220K
R5, 6	ERO10MKG5622	56.2K
R7, 8	ERD10TLJ271U	270
R9, 10	ERD10TLJ680U	68
R11, 12	ERD10TLJ184U	180K
R13, 14	ERD10TLJ123U	12K
R15, 16	ERD10TLJ563U	56K
R17, 18	ERD10TLJ102U	1K
R71, 72	ERD10TLJ334U	330K
R73, 74	ERD10TLJ102U	1K
R75, 76	ERD10TLJ124U	120K
R77, 78	ERD10TLJ103U	10K
R79, 80	ERD10TLJ220U	22
R101	ERDS2TJ153	15K
R102	ERDS2TJ103	10K
R103	ERDS2TJ683	68K
R104	ERDS2TJ273	27K
R105	ERDS2TJ224	220K
R106	ERDS2TJ104	100K
R107, 108	ERDS2TJ223	22K
R109	ERDS2TJ223	22K
R110	ERDS2TJ562	5.6K
R111, 112	ERDS2TJ103	10K
R201	ERDS2TJ153	15K
R202	ERDS2TJ102	1K
R203	ERDS2TJ273	27K
R204	ERDS2TJ152	1.5K
R205	ERDS2TJ154	150K
R206	ERDS2TJ124	120K
R207, 208	ERDS2TJ823	82K
R209, 210	ERDS2TJ223	22K
R211, 212	ERDS2TJ223	22K
R213, 214	ERDS2TJ273	27K
R301, 302	ERDS2TJ153	15K
R303	ERDS2TJ474	470K
R304	ERDS2TJ123	12K
R305	ERDS2TJ393	39K
R306	ERDS2TJ123	12K
R307	ERDS2TJ474	470K
R308	ERDS2TJ393	39K
R309	ERDS2TJ272	2.7K
R310, 311	ERDS2TJ223	22K
R312	ERDS2TJ223	22K
R313	ERDS2TJ104	100K
R314, 315	ERDS2TJ223	22K
R316, 317	ERDS2TJ223	22K
R318	ERDS2TJ223	22K
R319	ERDS2TJ153	15K
R320, 321	ERDS2TJ223	22K
R322	ERDS2TJ223	22K
R323, 324	ERDS2TJ103	10K
R325, 326	ERDS2TJ103	10K
R327, 328	ERDS2TJ273	27K
R329, 330	ERDS2TJ104	100K
R331, 332	ERDS2TJ472	4.7K
R333, 334	ERDS2TJ104	100K
R337	ERDS2TJ102	1K
R401, 402	ERDS2TJ272	2.7K
R403, 404	ERDS2TJ223	22K
R405, 406	ERDS2TJ104	100K
R407, 408	ERDS2TJ181	180
R409, 410	ERDS2TJ151	150
R411, 412	ERDS2TJ332	3.3K
R413, 414	ERDS2TJ272	2.7K
R415, 416 ⚠ Ⓢ	ERD25FJ100	10
R417, 418	ERG1ANJ331	330
R419	ERDS2TJ393	39K

• RESISTORS

Ref. No.	Part No.	Value
R420	ERDS2TJ153	15K
R421, 422	ERDS2TJ563	56K
R425	ERDS2TJ393	39K
R427, 428	ERDS2TJ223	22K
R431, 432	ERDS2TJ221	220
R501, 502	ERDS2TJ392	3.9K
R503, 504	ERDS2TJ392	3.9K
R505	ERDS2TJ392	3.9K
R506, 507	ERDS2TJ124	120K
R508, 509	ERDS2TJ124	120K
R510	ERDS2TJ124	120K
R511	ERDS2TJ223	22K
R512	ERDS2TJ684	680K
R519, 520	ERDS2TJ473	47K
R521, 522	ERDS2TJ473	47K
R523, 524	ERDS2TJ473	47K
R527, 528	ERDS2TJ472	4.7K
R529, 530	ERDS2TJ472	4.7K
R531, 532	ERDS2TJ472	4.7K
R533	ERDS2TJ103	10K
R534	ERDS2TJ472	4.7K
R535	ERDS2TJ103	10K
R536 Ⓢ	ERDS25FJ6R8	6.8
R537	ERDS2TJ561	560
R538	ERDS2TJ271	270
R539 ⚠ Ⓢ	ERD25FJ220	22
R540, 541	ERDS2TJ223	22k
R542	ERDS2TJ223	22K
R543, 544	ERDS2TJ183	18K
R545	ERDS2TJ183	18K
R601, 602 ⚠ Ⓢ	ERD25FJ4R7	4.7
R603, 604	ERDS2TJ332	3.3K
R605	ERDS2TJ100	10
R606	ERDS2TJ393	39K
R607	ERDS2TJ223	22K
R608	ERDS2TJ122	1.2K
R609 ⚠	ERDS1FJ390	39
R650 ⚠ Ⓢ	ERD25FJ100	10
R701	ERDS2TJ682	6.8K
R702	ERDS2TJ392	3.9K
R703	ERDS2TJ124	120K
R704	ERDS2TJ682	6.8K
R705, 706 [EGA] only	ERDS2TJ471	470
R707, 708 [EGA] only	ERDS2TJ222	2.2K
R709, 710 [EGA] only	ERDS2TJ222	2.2K
R711, 712 [EGA] only	ERDS2TJ222	2:2K
R713, 714 [EGA] only	ERDS2TJ222	2.2K

• CAPACITORS

Ref. No.	Part No.	Value
C1 A ⚠	ECKDKC103PF2	0.01
C1, 2 Ⓢ	ECEA50Z3R3	3.3
C3, 4 Ⓢ	ECCD1H101K	100P
C5, 6 Ⓢ	ECKD1H102ZF	0.001
C7, 8 Ⓢ	ECQM1H223JZ	0.022
C9, 10 Ⓢ	ECQM1H683JZ	0.068
C11, 12 ⚠	ECEA1HN010S	1
C13, 14 Ⓢ	ECEA1CS330	33
C71, 72 Ⓢ	ECEA50Z3R3	3.3
C73, 74 Ⓢ	ECCD1H390K	39P
C75, 76 Ⓢ	ECCD1H820K	82P
C77, 78 Ⓢ	ECKD1H391KB	390P
C101 Ⓢ	ECCD1H121K	120P
C102	ECEA0JU330	33
C103	ECEA1HU010	1
C104	ECEA1AU101	100
C105, 106 Ⓢ	ECKD1H103ZF	0.01
C107, 108 Ⓢ	ECKD1H561KB	560P
C201 Ⓢ	ECKD1H332KB	0.0033
C202	ECEA1EU3R3	3.3
C203 Ⓢ	ECCD1H101K	100P
C204, 205	ECEA1EU3R3	3.3
C206, 207	ECEA1EU3R3	3.3
C208, 209 Ⓢ	ECKD1H333ZF	0.0333
C217, 218 Ⓢ [EGA] only	ECKD1H102KB	0.001
C250 Ⓢ	ECKD1H103ZF	0.01
C301	ECFTD823KXL	0.082
C302	ECEA1EU3R3	3.3
C303	ECFTD152KXL	0.0015
C304	ECEA1CU330	33
C305	ECEA1EU3R3	3.3
C306	ECFTD683KXL	0.068
C307, 308	ECFTD183KXL	0.018
C309	ECFTD152KXL	0.0015
C310 Ⓢ	ECKD1H102ZF	0.001
C311, 312	ECEA1CU100	10
C313, 314	ECEA1EKS3R3	3.3
C315, 316	ECEA1EU3R3	3.3
C317, 318 Ⓢ	ECCD1H820K	82P
C319, 320	ECEA1CKS100	10
C321, 322	ECFTD563KXL	0.056
C323, 324	ECFTD223KXL	0.022
C325, 326	ECFTD472KXL	0.0047
C327, 328	ECFTD102KXL	0.001
C329, 330 Ⓢ	ECKD1H561KB	560P
C331	ECEA1HKS010	1
C332	ECEA1HU010	1
C333, 334	ECEA1HKR22	0.22
C335, 336	ECFTD683KXL	0.068
C337, 338	ECFTD183KXL	0.018
C339, 340	ECFTD392KXL	0.0039
C341 Ⓢ	ECKD1H152KB	0.0015
C342	ECEA1CKS100	10
C343	ECEA1CU101	100
C344, 345 Ⓢ	ECKD1H103ZF	0.01
C346, 347 Ⓢ	ECKD1H103ZF	0.01
C351, 352 Ⓢ [EGA] only	ECCD1H120K	12P
C401, 402	ECEA0JU101	100
C403, 404	ECEA1EU4R7	4.7
C405, C406 Ⓢ	ECCD1H820K	82P
C407, 408 Ⓢ	ECKD1H681KB	680P
C409, 410 Ⓢ	ECCD1H220K	22P
C411, 412 Ⓢ	ECCD1H820K	82P
C413, 414 Ⓢ	ECCD1H820K	82P
C415, 416 Ⓢ	ECKD1H333ZF	0.033
C417, 418	ECEA1HU4R7	4.7
C419, 420	ECEA1HU4R7	4.7
C421, 422 Ⓢ	ECKD1H223ZF	0.022
C423	ECEA1AU470	47
C424	ECEA1HU100	10
C425	ECEA1HUR47	0.47
C426	ECEA1EU4R7	4.7
C427	ECEA1HU0R1	0.1
C428, 429 Ⓢ	ECKD1H103ZF	0.01
C430 Ⓢ [EGA] only	ECCD1H103ZF	0.01
C431 Ⓢ [EGA] only	ECKD1H473ZF	0.047
C432, 433 Ⓢ [EGA] only	ECCD1H103ZF	0.01
C435, 436 Ⓢ [EGA] only	ECKD1H391KB	390P
C501, 502	ECEA1HU0R1	0.1
C503, 504	ECFTD273KXL	0.027
C505, 506	ECFTD682KXL	0.0068
C507, 508	ECFTD182KXL	0.0018
C509 Ⓢ	ECKD1H561KB	560P
C510 Ⓢ	ECKD1H681KB	680P
C511, 512	ECEA1CU100	10
C513, 514	ECEA1CU100	10
C515, 516	ECEA1CU100	10
C517	ECEA1CU101	100
C518	ECEA0JU101	100
C520	ECEA1CU101	100
C521, 522 Ⓢ	ECKD1H222ZF	0.0022
C523 Ⓢ	ECKD1H222ZF	0.0022
C601 Ⓢ	ECKD2H103PF	0.01
C601 Ⓢ [EGA] only	ECQE1104KN	0.1
C602, 603	ECETS42V472U	4700
C604, 605 Ⓢ	ECKD1H333ZF	0.033
C606, 607	ECEA1CU100	10
C608	ECEA1HU100	10
C609 Ⓢ	ECKD1H333ZF	0.033
C701, 702 Ⓢ [EGA] only	ECKD1H223ZF	0.022
C703, 704 Ⓢ [EGA] only	ECCD1H180KC	180P
C705, 706 Ⓢ [EGA] only	ECCD1H150K	150P
C707~712 Ⓢ [EGA] only	ECCD1H101K	100P
C713, 714 Ⓢ [EGA] only	ECKD1H103ZF	0.01
C715, 716 Ⓢ [EGA] only	ECCD1H820K	82P

■ REPLACEMENT PARTS LIST (Electronic parts)

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1 [EGA] only	AN6558F	Equalizer Amp.
IC1 other	SVINJ4559DDM	Equalizer Amp.
IC71	AN7062N	Voltage Amp.
IC101	TC9164N	Input Selector
IC102	LM6416E441	Input Selector Control
IC201, 202, 301~304	M5218P	Mic Amp, Mixing Amp, and Phase Shifter Circuit
IC303, 304 [EGA] only	SVINJM2043DD	Phase Shift, Buffer
IC305, 306	M5226P	Graphic Equalizer Amp.
IC401	SVISTK2028BM	Power Amp.
IC402	AN7072N	Mutin and Protection Circuit
IC501~503	AN6552F	Band Pass Filter Circuit
IC504, 506	DN74LS145	Multiplexer, Decoder/Driver
IC505, 507	AN6873N	FL Driver
IC508	SVIBA6148	Level Meter
TRANSISTORS		
Q71, 72	2SA1123−R	Voltage Amp.
Q101	UN4211	Inverter
Q102	UN4111	Level Shift
Q103, 104, 702, 703	2SK301−S	Muting Switch
Q401, 603	2SC1815Y	Muting Switch, Regulator
Q501~506	2SA1253−S	Switching
Q507~515	UN4115	Inverter
Q601	2SD1265−O	Regulator
Q602	2SB941−P	Regulator
Q604	2SC1384NC−R	Regulator
Q701	2SA1015Y	Input Selector
DIODES		
D71, 72 Ⓢ	MA162A	Switching
D101, 102, 104, 106, 107, 401, 402, 501~506, 509, 702	MA165	Switching
D301	MA4030M	3V Zener
D302	MA4051M	5.1V Zener
D507	MA4110M	11V Zener
D508	LN81CPHL	AV Surround Ind.
D601~604 ⚠	SVDS2V20	Rectifier
D605	MA4140−M	14V Zener
D606	MA4160M	16V Zener
D607, 650	MA167	Rectifier
D608	MA4062−M	6.2V Zener
D701 Ⓢ	MA162A	Switching
COILS		
L401, 402 [EGA] only	SLQY07G−30	Choke
L701, 702 [EGA] only	SLQY07G−30	Choke
L703, 704 [EGA] only	SLQX400−D	Choke
TRANSFORMERS		
T1 [EK, XL] ⚠	SLT5M423−W	Power Transformer
T1 [XA] only ⚠	SLT5M424−W	Power Transformer
T1 other ⚠	SLT5M422−W	Power Transformer
VARIABLE RESISTORS		
VR201, 301	EWAMF0X05B53	Mic Level, AV Surround Control, 5KΩ (B)
VARIABLE RESISTORS		
VR302~306	EWAMAGX10G15	Graphic Equalizer Control, 100KΩ (G)
VR401	EWAQA6X10B15	Volume Control, 100KΩ (B)
VR402	EWAMF5X05G15	Balance Control, 100KΩ (G)
FLUORESCENT DISPLAY TUBE		
FL	SADBG292ZK	Spectrum Analyzer and AV Surround Ind.
COMPONENT COMBINATIONS		
Z102, 103	EXBP86223M	22kΩ ×6
Z501, 502	EXBP86222M	2.2kΩ ×6
Z503	EXBP89223M	22kΩ ×9
FUSES		
F1 Except [EGA, EW, XA] ⚠	XBA2C08TR0	250V, T800mA
F2 [EGA, EW, XA] only ⚠	XBA2C08TR0	250V, T800mA
F3 [EGA, EW, XA] only ⚠	XBA2C16TR0	250V, T1.6A
SWITCHIES		
S1	SSS159	AV Surround
S2	SSS162	Equalizer
S101~106	SSG13	Input Selector
S3 ⚠	SSH1071	Power
S4 [XA] only ⚠	ESE37263	Voltage Selector

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement part list.

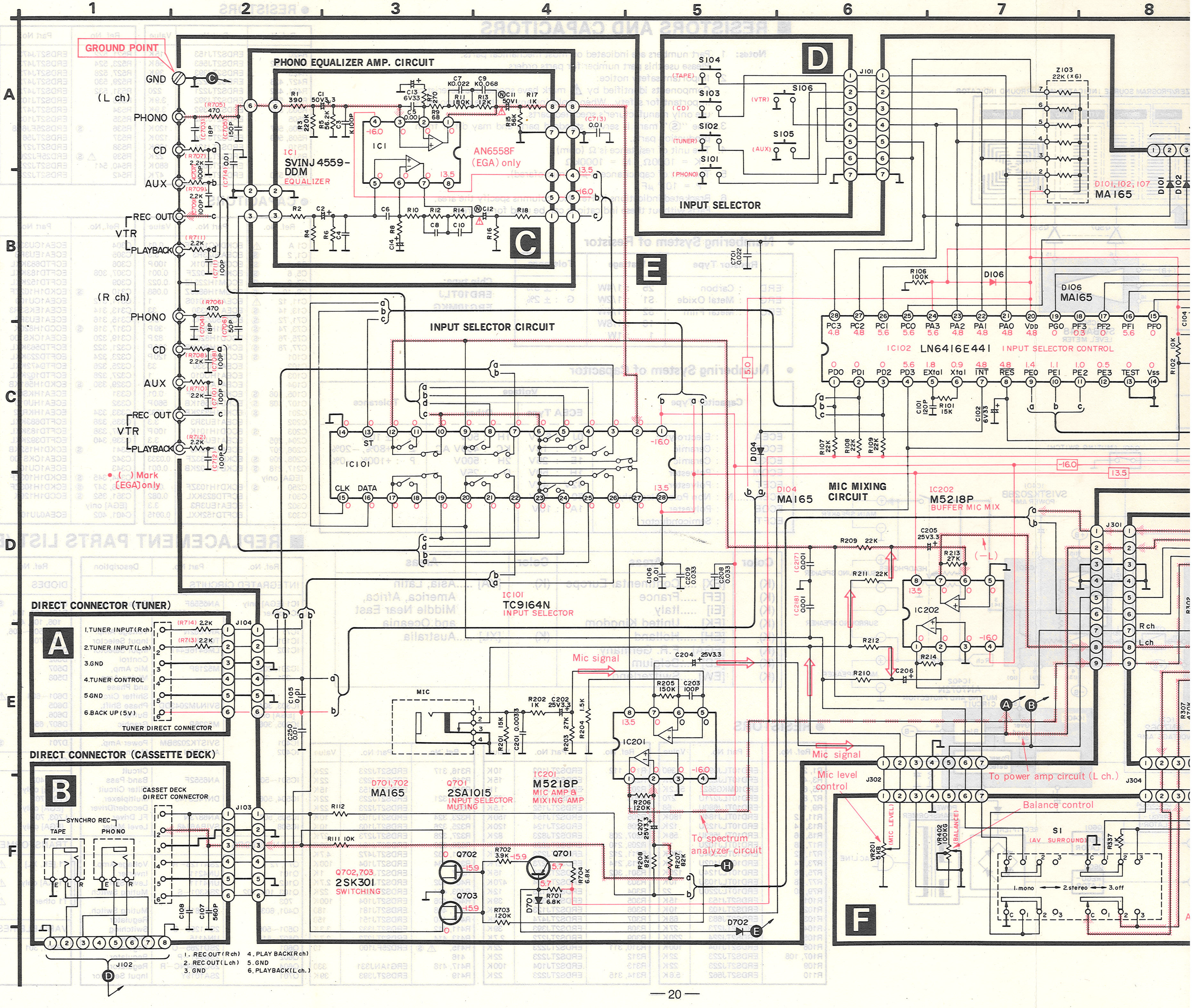
Notes:

1. **S1** : AV surround selector switch in "**stereo**" position.
   off ←→ stereo ←→ mono
2. **S2** : Equalizer ON/OFF control switch in "**off**" position.
   off ←→ on
3. **S3** : Power switch in "**on**" position.
4. **S4 [XA] only** : Voltage selector switch in "**240V**" position.
   110V ←→ 127V ←→ 240V ←→ 220V
5. **S101 ～ S106** : Input selector switch.
   S101 : phono S104 : tape
   S102 : tuner S105 : aux
   S103 : CD S106 : VTR
6. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
7. All voltage values shown in circuitry are the standard values for the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
8. ▨ Phono signal (L ch.)
   ⇨ Microphone signal
   ⇨ Phase shift signal.
9. — Positive voltage lines and Negative voltage lines.
10. This is the basic circuit diagram (For continental Europe) and related areas [EK], [XL], [XA], [EGA], [EW] refer to the separate service manual (Order No. HAD85022421C9—A).

*** Caution !**

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- ★ Cover the parts boxes made of plastics with aluminum foil.
- ★ Ground the soldering iron.
- ★ Put a conductive mat on the work table.
- ★ Do not touch the legs of IC or LSI with the fingers directly.


1
2
3
4
5
6
7
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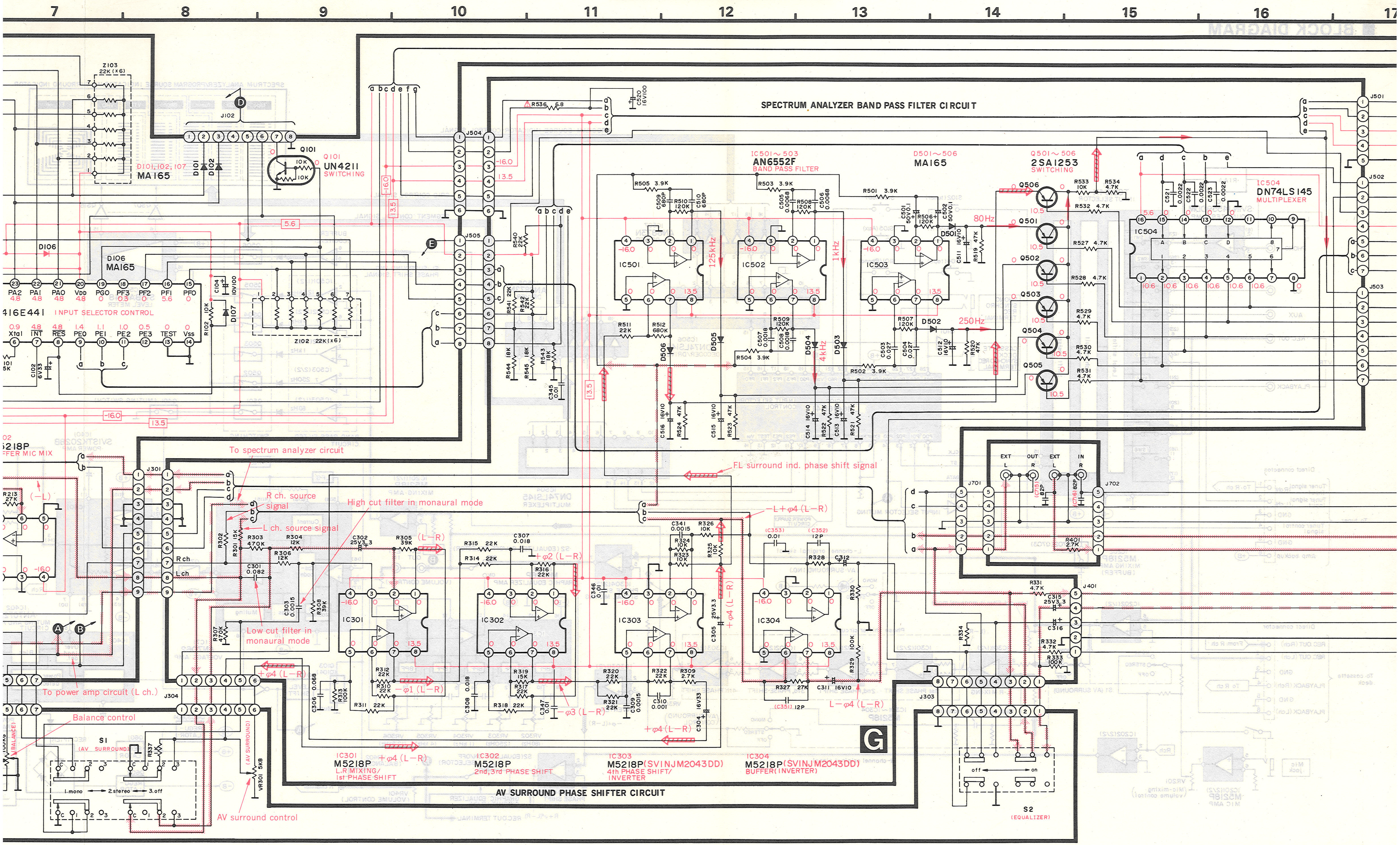
A
B
C
D
E
F
GROUND POINT
GND
(L ch)
PHONO
CD
AUX
REC OUT
VTR
PLAYBACK
(R ch)
PHONO EQUALIZER AMP. CIRCUIT
IC1 SVINJ 4559-DDM
EQUALIZER
AN6558F (EGA) only
INPUT SELECTOR
S104 (TAPE)
S103 (CD)
S102 (TUNER)
S101 (PHONO)
S106 (VTR)
S105 (AUX)
J101
Z103 22K (×6)
D101, 102, 107 MA165
INPUT SELECTOR CIRCUIT
IC101
TC9164N
INPUT SELECTOR
IC102 LN6416E441 INPUT SELECTOR CONTROL
D106 MA165
D104 MA165
MIC MIXING CIRCUIT
IC202 M5218P BUFFER MIC MIX
IC201 M5218P MIC AMP & MIXING AMP
Mic signal
MIC
DIRECT CONNECTOR (TUNER)
1.TUNER INPUT(Rch)
2.TUNER INPUT(Lch)
3.GND
4.TUNER CONTROL
5.GND
6.BACK UP(5V)
TUNER DIRECT CONNECTOR
J104
DIRECT CONNECTOR (CASSETTE DECK)
CASSET DECK DIRECT CONNECTOR
SYNCHRO REC
TAPE
PHONO
J103
J102
1. REC OUT(Rch)
2. REC OUT(Lch)
3. GND
4. PLAY BACK(Rch)
5. GND
6. PLAYBACK(L ch.)
D701,702 MA165
Q701 2SA1015 INPUT SELECTOR MUTING
Q702,703 2SK301 SWITCHING
Q702
Q703
Q701
D701
D702
J301
R ch
L ch
J302
J304
Mic level control
To power amp circuit (L ch.)
Balance control
To spectrum analyzer circuit
VR201 5K B (MIC LEVEL)
VR402 100KG (BALANCE)
S1 (AV SURROUND)
1.mono
2.stereo
3.off
● ( ) Mark (EGA) only
-16.0
13.5


7
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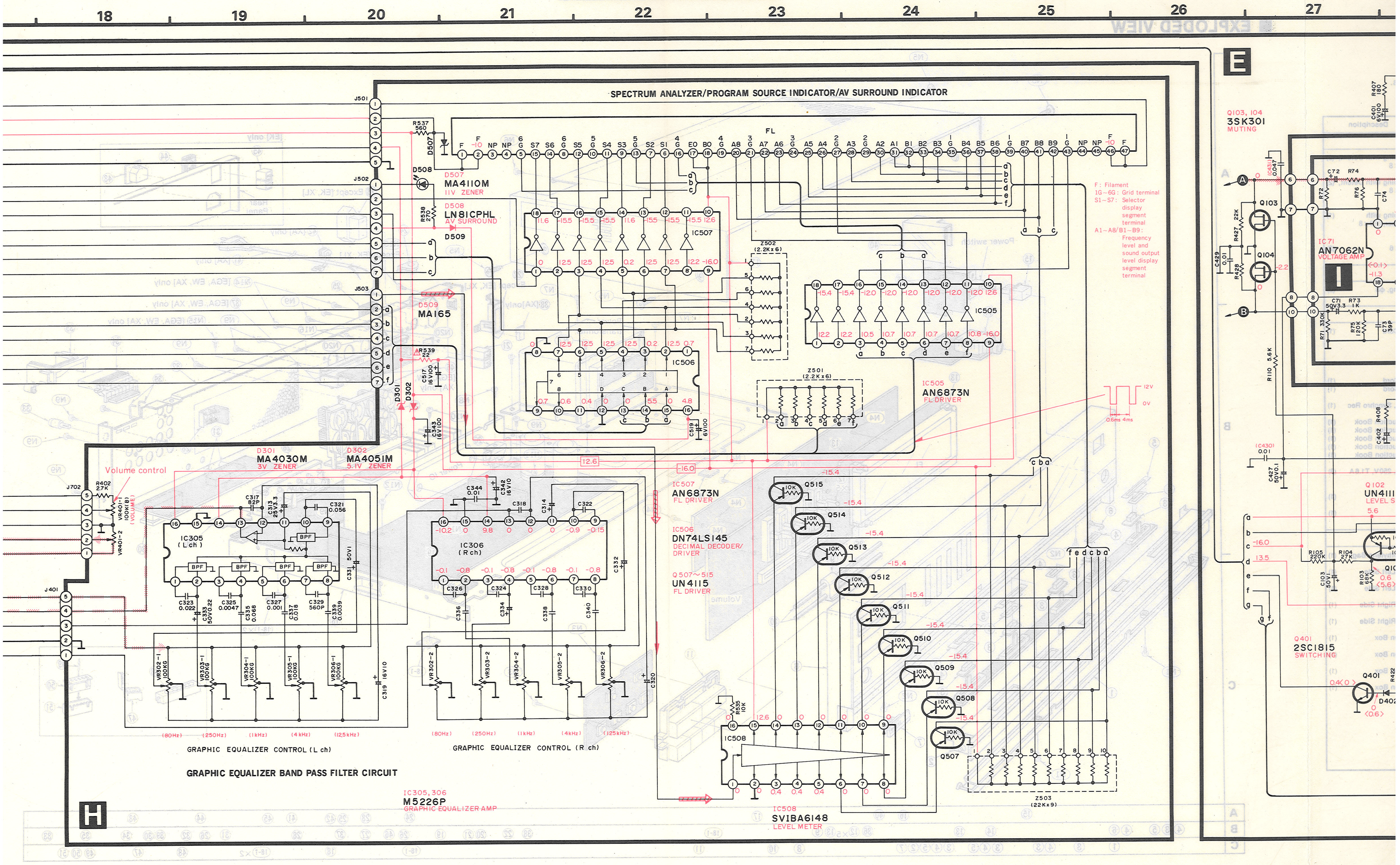
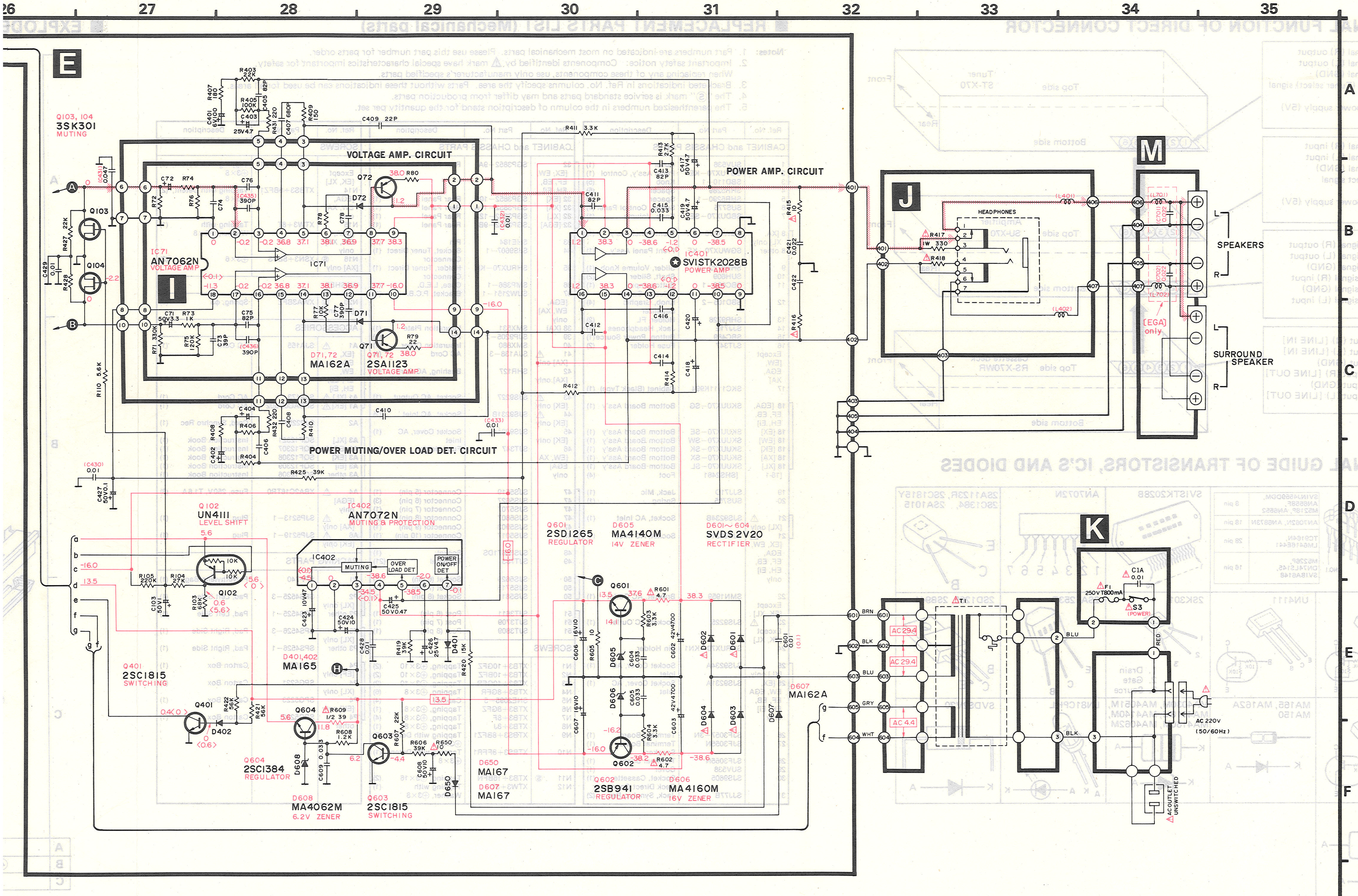
11
12
13
14
15
16
17
SPECTRUM ANALYZER BAND PASS FILTER CIRCUIT
AV SURROUND PHASE SHIFTER CIRCUIT
Z103 22K(×6)
D101,102,107 MA165
D101
D102
J102
Q101 UN4211 SWITCHING
D106 MA165
D106
416E441
INPUT SELECTOR CONTROL
PA2 PA1 PA0 VDD PG0 PF3 PF2 PF1 PF0
Xtal INT RES PE0 PE1 PE2 PE3 TEST VSS
Z102 22K(×6)
D107
J504
J505
J501
J502
J503
R536 6.8
C520 16V100
IC501～503 AN6552F BAND PASS FILTER
D501～506 MA165
Q501～506 2SA1253 SWITCHING
IC504 DN74LS145 MULTIPLEXER
IC501
IC502
IC503
IC504
125kHz
1kHz
4kHz
80Hz
250Hz
Q501
Q502
Q503
Q504
Q505
Q506
D501
D502
D503
D504
D505
D506
To spectrum analyzer circuit
FL surround ind. phase shift signal
R ch. source signal
L ch. source signal
High cut filter in monaural mode
Low cut filter in monaural mode
J301
J304
J303
J401
J701
J702
R ch
L ch
−L+φ4 (L−R)
+φ1 (L−R)
+φ2 (L−R)
−φ3 (L−R)
+φ4 (L−R)
L−φ4 (L−R)
IC301
IC302
IC303
IC304
IC301 M5218P L.R MIXING/ 1st PHASE SHIFT
IC302 M5218P 2nd, 3rd PHASE SHIFT
IC303 M5218P(SVINJM2043DD) 4th PHASE SHIFT/ INVERTER
IC304 M5218P(SVINJM2043DD) BUFFER(INVERTER)
EXT OUT EXT IN
To power amp circuit (L ch.)
Balance control
S1 (AV SURROUND)
1.mono 2.stereo 3.off
VR301 5KB
AV surround control
S2 (EQUALIZER)
off on
G
A
B
D
E
−16.0
13.5
5.6


18
19
20
21
22
23
24
25
26
27
E
H
I
SPECTRUM ANALYZER/PROGRAM SOURCE INDICATOR/AV SURROUND INDICATOR
FL
F: Filament
1G–6G: Grid terminal
S1–S7: Selector display segment terminal
A1–A8/B1–B9: Frequency level and sound output level display segment terminal
J501
J502
J503
J702
J401
R537 560
D507
D508
R538 270
D509
R539 22
C517 16V100
C343 16V100
C519 6V100
D507 MA4110M 11V ZENER
D508 LN81CPHL AV SURROUND
D509 MA165
D301 MA4030M 3V ZENER
D302 MA4051M 5.1V ZENER
IC507
IC506
IC505
Z502 (2.2K×6)
Z501 (2.2K×6)
Z503 (22K×9)
IC505 AN6873N FL DRIVER
IC507 AN6873N FL DRIVER
IC506 DN74LS145 DECIMAL DECODER/DRIVER
Q507～515 UN4115 FL DRIVER
Q515
Q514
Q513
Q512
Q511
Q510
Q509
Q508
Q507
IC508
IC508 SVIBA6148 LEVEL METER
R535 10K
12V
0V
0.6ms 4ms
Volume control
R402 2.7K
VR401-1 100K(B) (VOLUME)
VR401-2
IC305 (L ch)
IC306 (R ch)
BPF
C317 82P
C313 25V3.3
C321 0.056
C344 0.01
C342 16V10
C318
C314
C322
C323 0.022
C333 50V0.22
C325 0.0047
C335 0.068
C327 0.001
C337 0.018
C329 560P
C339 0.0039
C331 50V1
C332
C326
C324
C328
C330
C336
C334
C338
C340
C319 16V10
C320
VR302-1 100KG
VR303-1 100KG
VR304-1 100KG
VR305-1 100KG
VR306-1 100KG
VR302-2
VR303-2
VR304-2
VR305-2
VR306-2
(80Hz)
(250Hz)
(1kHz)
(4kHz)
(12.5kHz)
GRAPHIC EQUALIZER CONTROL (L ch)
GRAPHIC EQUALIZER CONTROL (R ch)
GRAPHIC EQUALIZER BAND PASS FILTER CIRCUIT
IC305, 306 M5226P GRAPHIC EQUALIZER AMP
Q103, 104 3SK301 MUTING
Q103
Q104
R427 22K
R428
C429 0.01
C72
R74
R72
R76
C74
IC71 AN7062N VOLTAGE AMP
C71 50V3.3
R73 1K
R71 330K
R75 120K
C73 39P
R110 5.6K
(C431) 0.047
(C430) 0.01
C427 50V0.1
Q102 UN4111 LEVEL S
R105 220K
R104 27K
C103 50V1
R103 68K
Q401 2SC1815 SWITCHING
Q401
D402
R407 180
C401 6V100
R408
C402


26
27
28
29
30
31
32
33
34
35
E
I
J
M
K
A
B
C
D
E
F
VOLTAGE AMP. CIRCUIT
POWER AMP. CIRCUIT
POWER MUTING/OVER LOAD DET. CIRCUIT
Q103, 104
3SK301
MUTING
IC71
AN7062N
VOLTAGE AMP
Q72
D72
D71
Q71
D71, 72
MA162A
Q71, 72
2SA1123
VOLTAGE AMP
IC401
SVI STK2028B
POWER AMP
HEADPHONES
SPEAKERS
L
R
SURROUND SPEAKER
[EGA] only
Q102
UN4111
LEVEL SHIFT
IC402
AN7072N
MUTING & PROTECTION
MUTING
OVER LOAD DET
POWER ON/OFF DET
Q401
2SC1815
SWITCHING
D401, 402
MA165
Q604
2SC1384
REGULATOR
D608
MA4062M
6.2V ZENER
Q603
2SC1815
SWITCHING
Q601
2SD1265
REGULATOR
D605
MA4140M
14V ZENER
D601 ~ 604
SVDS2V20
RECTIFIER
D650
MA167
D607
MA167
Q602
2SB941
REGULATOR
D606
MA4160M
16V ZENER
D607
MA162A
T1
BRN
BLK
BLU
GRY
WHT
AC 29.4
AC 29.4
AC 4.4
C1A
0.01
F1
250V T800mA
S3
(POWER)
RED
BLU
BLK
AC 220V
(50/60Hz)
AC OUTLET
UNSWITCHED

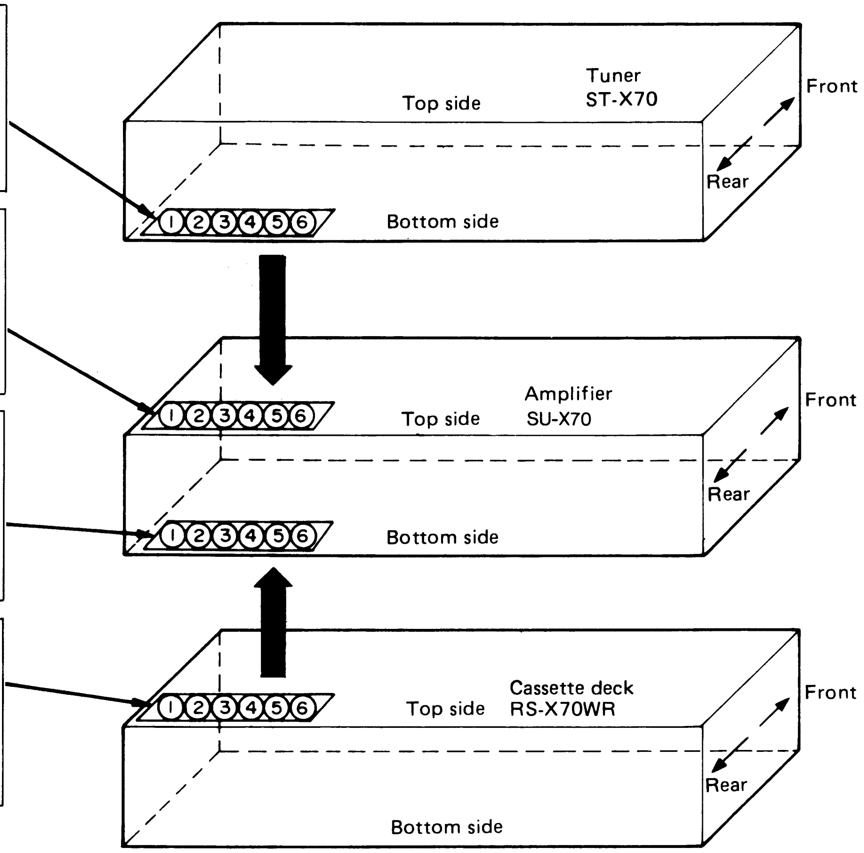
■ TERMINAL FUNCTION OF DIRECT CONNECTOR

① Tuner signal (R) output
② Tuner signal (L) output
③ Tuner signal (GND)
④ Amplifier (Tuner select) signal
⑤ Ground
⑥ Back up power supply (5V) output

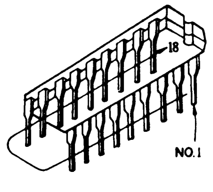
① Tuner signal (R) input
② Tuner signal (L) input
③ Tuner signal (GND)
④ Tuner select signal
⑤ Ground
⑥ Back up power supply (5V) input

① Rec out signal (R) output
② Rec out signal (L) output
③ Rec out signal (GND)
④ Playback signal (R) input
⑤ Playback signal (GND)
⑥ Playback signal (L) input

① Signal input (R) [LINE IN]
② Signal input (L) [LINE IN]
③ Signal input (GND)
④ Signal output (R) [LINE OUT]
⑤ Signal output (GND)
⑥ Signal output (L) [LINE OUT]

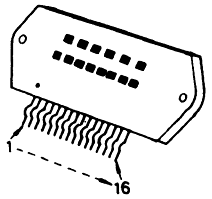


■ TERMINAL GUIDE OF TRANSISTORS, IC'S AND DIODES

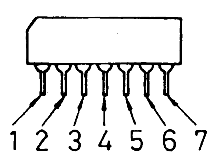


SVINJ4559DDM, AN6558F, M5218P, AN6552	8 pin
AN7062N, AN6873N	18 pin
TC9164N, LM6416E441	28 pin
M5226P, DN74LS145, SVIBA6148	16 pin

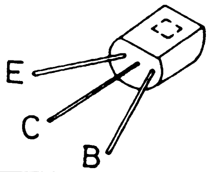
SVISTK2028B



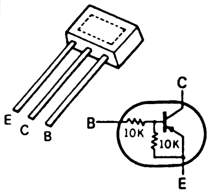
AN7072N



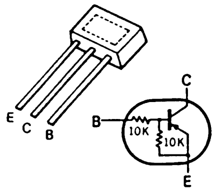
2SA1123R, 2SC1815Y
2SC1384, 2SA1015



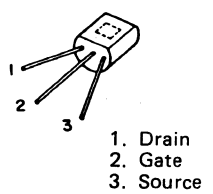
UN4211



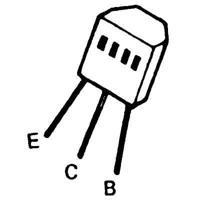
UN4111



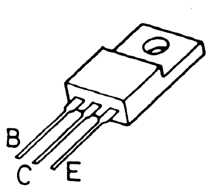
2SK301



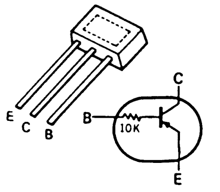
2SA1253R



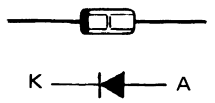
2SD1265, 2SB941



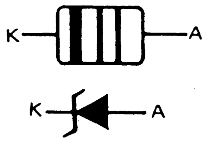
UN4115



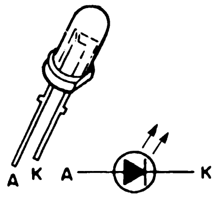
MA165, MA162A
MA150



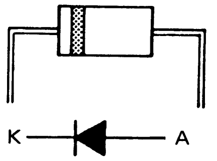
MA4030M, MA4051M,
MA4110M, MA4140M,
MA4160M, MA4062M



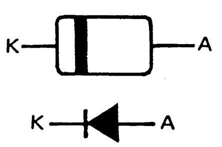
LN81CPHL



SVDS2V20



MA167

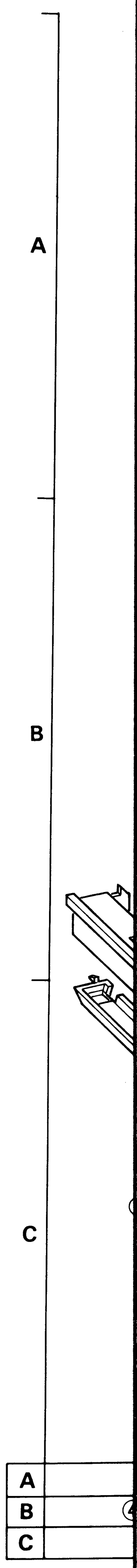


■ REPLACEMENT PARTS LIST (Mechanical parts)

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "Ⓢ" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
1	SUV536	Cover (1)
2	SGYUX70−KE	Panel Ass'y, Control (1)
3	SBD110−1	Knob (5)
4	SHR5289	Spacer (5)
5	SHR5290−1	Spacer (3)
6	SUS775	Spring, Control Panel (1)
7	SBDUX70−SE	Knob, Volume (1)
8 [XA, XL] only	SGWUX70−KX	Front Panel Ass'y (1)
8 other	SGWUX70−KE	Front Panel Ass'y (1)
9	SHR9722−2	Slider, Volume Knob (1)
10	SUH609	Shaft, Slider (2)
11	SBC682−1	Button, Input Selector Switch (1)
12	SBD105−2	Knob, Graphic Equalizer (4)
13	SHR9728	Holder, FL (2)
14	SJJ71E	Jack, Headphones (1)
15	SBC489	Button, Power Source (1)
16 Except [EW, EGA, XA]	SJT347	Fuse Holder (2)
17	SKC1111K994	Cabinet (Black Type) (1)
18 [EGA, EF, EB, EH, Ei]	SKUUX70−SG	Bottom Board Ass'y (1)
18 [EX]	SKUUX70−SE	Bottom Board Ass'y (1)
18 [EW]	SKUUX70−SW	Bottom Board Ass'y (1)
18 [EK]	SKUUX70−SK	Bottom Board Ass'y (1)
18 [XA]	SKUUX70−SX	Bottom Board Ass'y (1)
18 [XL]	SKUUX70−SL	Bottom Board Ass'y (1)
[18-1	[SHS2481	Foot (4)
19	SJJ71D	Jack, Mic (1)
20	SUS755	Spring (1)
21 ⚠ [XL] only	SJS9234B	Socket, AC Inlet (1)
21 ⚠ [EX, EW, EGA, EF, EB, EH, Ei] only	SJS9231B	Socket, AC Inlet (1)
22 Except [EK, XL]	SMN1959	Bracket, AC Outlet (1)
23 ⚠ Except [EK, XL]	SJS9225	Socket, AC Outlet (1)
24	SHRUX70−KN1	Pin Holder (1)
25 [XL] only	SJS9234A	Socket Cover, AC Inlet (1)
25 [EX, EW, EGA EF, EB, EH, Ei] only	SJS9231A	Socket Cover, AC Inlet (1)
26	SJF3057−3N	Terminal Board (1)
27	SJF3055N	Terminal Board, Speaker (1)
28	SJF3055N	Terminal Board, (1)
29	SUV538	Cover (1)
30	SJS9605	Socket, Cassette Deck Direct Connector (1)
31	SJJ77B	Jack, Synchro Rec (2)
32 [EX, EW, EF, EB, EH, Ei]	SGP3852−9A	Rear Panel (1)
32 [EK]	SGP3852−10A	Rear Panel (1)
32 [XA]	SGP3852−11A	Rear Panel (1)
32 [XL]	SGP3852−12A	Rear Panel (1)
32 [EGA]	SGP3852−9B	Rear Panel (1)
33	SHE184	Pin (1)
34	SJS9607−1	Socket, Tuner Direct Connector (1)
35	SHRUX70−KN	Holder, Tuner Direct Connector (1)
36	SMP386−1	Case, L.E.D. (1)
37 [EGA, EW, XA] only	SUW2151−1	Bracket, P.C.B. (1)
38 [XA]	SMX531	Insuration Plate (1)
39	SJP9205−2	Pin (1)
40	SMX880	Insuration Cover (1)
41 ⚠ [XA] only	SJA138−3	AC Cord (1)
42 [XA] only	SHR127	Bushing, AC Cord (1)
43 ⚠ [EK] only	SJS9227	Socket, AC Output (1)
44 ⚠ [EK] only	SJS9231B	Socket, AC Inlet (1)
45 [EK] only	SJS9231A	Socket Cover, AC Inlet (1)
46 [EW, XA EGA] only	SJT347	Fuse Holder (4)
47	SJS5519	Connector (5 pin) (1)
47	SJS5627	Connector (6 pin) (3)
47	SJS5707	Connector (7 pin) (1)
47	SJS5807	Connector (8 pin) (2)
47	SJS5903	Connector (9 pin) (1)
47	SJS5017	Connector (10 pin) (1)
48	SJS50671DS	Socket (1)
49	SJT783	Terminal (21)
50	SJS5629	Socket (6 pin) (1)
50	SJS5715	Socket (7 pin) (1)
50	SJS5811	Socket (8 pin) (1)
51	SJT3611	Post (6 pin) (1)
51	SJT3709	Post (7 pin) (1)
51	SJT3809	Post (8 pin) (1)
SCREWS		
N1	XTB3+10GFZ	Tapping, ⊕3×10 (2)
N2	XTB3+10BFZ	Tapping, ⊕3×10 (2)
N3	XTB3+10GFR	Tapping, ⊕3×10 (2)
N4	XTB3+8GFR	Tapping, ⊕3×8 (6)
N5	SNE2095−5	Cabinet (4)
N6	XTB3+8GFZ	Tapping, ⊕3×8 (1)
N7	XTB3+8F	Tapping, ⊕3×8 (4)
N8	XTB3+8J	Tapping, ⊕3×8 (1)
N9	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (8)
N10	XTBS3+8FFR1	Tapping with Detent, ⊕3×8 (1)
N11 Ⓢ	XTB3+16BFN	Tapping, ⊕3×16 (2)
N12	XTW3+8T	Tapping with Washer, ⊕3×8 (1)
N13 Except [EK, XL]	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (2)
N14 [EGA, EW, XA] only	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (2)
N15 [EGA, EW, XA] only	XTW3+8T	Tapping with Washer, ⊕3×8 (1)
N16 Ⓢ [XA] only	XSN3+8BVS	⊕3×6 (2)
WASHER		
N20 Ⓢ [XA] only	XWA3BFZ	Spring, φ3 (2)
ACCESSORIES		
A1 ⚠ [EX, EGA, EW, EF, EB, EH, Ei]	SJA155	AC Cord (1)
A1 [XL] ⚠	SJA173	AC Cord (1)
A1 [EK] ⚠	SFDAC05G02	AC Cord (1)
A2	SJP2257	Cord, Synchro Rec (1)
A3 [XL]	SQF12321	Instruction Book (1)
A3 [EGA]	SQF12307	Instruction Book (1)
A3 [EK]	SQF12308	Instruction Book (1)
A3 [Ei]	SQF12309	Instruction Book (1)
A3 other	SQF12306	Instruction Book (1)
A4 ⚠ [EGA] only	XBA2C16TR0	Fuse, 250V, T1.6A (3)
A5 ⚠ [XA] only	SJP5213−1	Plug (1)
A6 ⚠ [EK] only	SJP5219−1	Plug (1)
PACKING PARTS		
P1	SPP740	Polyethylene Bag (1)
P2 [XL] only	SPS4525−3	Pad, Left Side (1)
P2 other	SPS4525−1	Pad, Left Side (1)
P3 [XL] only	SPS4526−3	Pad, Right Side (1)
P3 other	SPS4526−1	Pad, Right Side (1)
P4 [EF] only	SPG5220	Carton Box (1)
P4 [XL] only	SPG5221	Carton Box (1)
P4 [EK] only	SPG5223	Carton Box (1)
P4 other	SPG5222	Carton Box (1)

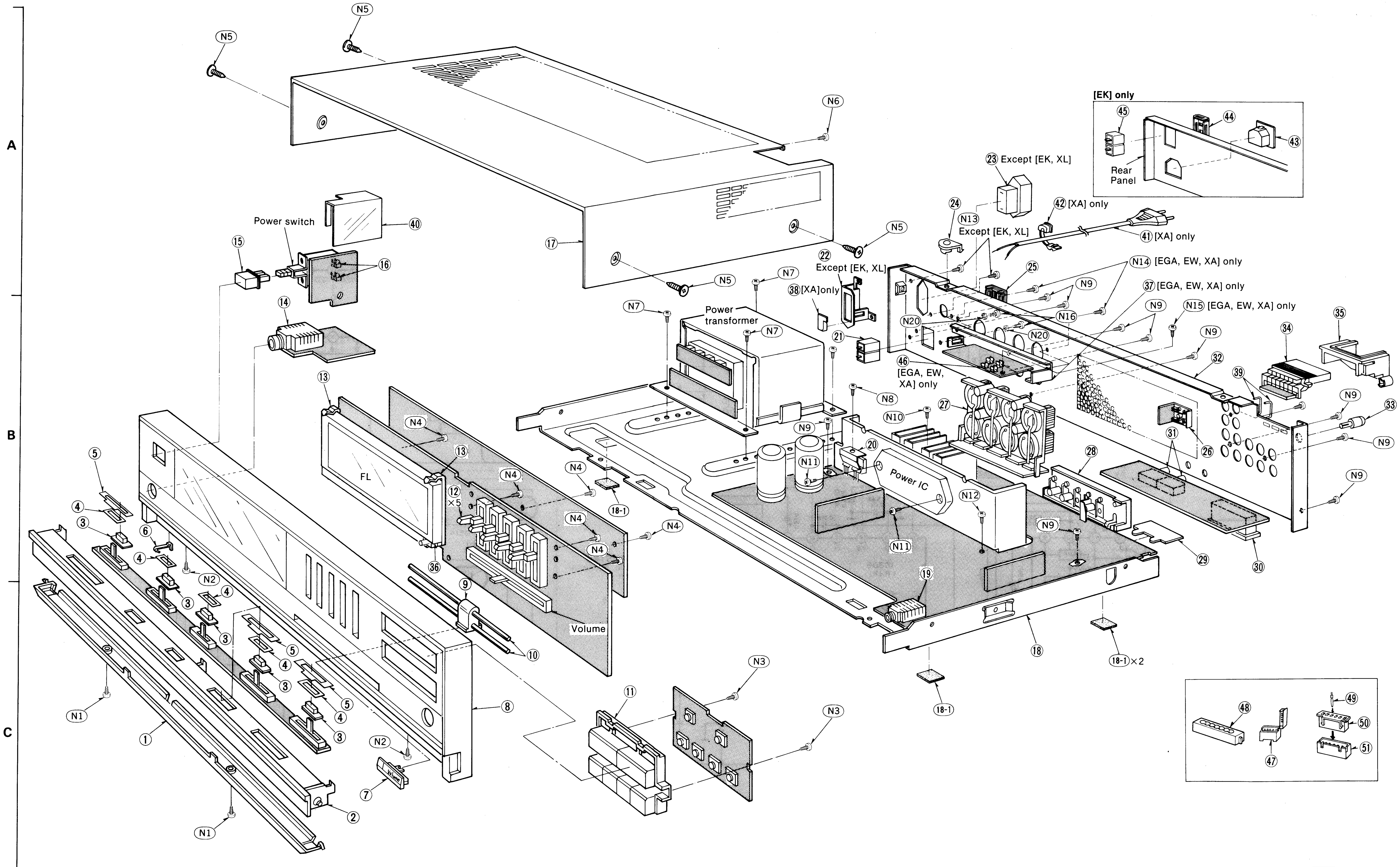
■ EXPLODE



as.

Description	
pping with Detent, ×8	(2)
pping with Detent, ×8	(2)
pping with sher, ⊕3×8	(1)
×6	(2)
ring, φ3	(2)
Cord	(1)
Cord	(1)
Cord	(1)
rd, Synchro Rec	(1)
truction Book	(1)
truction Book	(1)
truction Book	(1)
truction Book	(1)
truction Book	(1)
se, 250V, T1.6A	(3)
g	(1)
g	(1)
lyethylene Bag	(1)
d, Left Side	(1)
d, Left Side	(1)
d, Right Side	(1)
d, Right Side	(1)
rton Box	(1)
rton Box	(1)
rton Box	(1)
rton Box	(1)

■ EXPLODED VIEW


A
B
C
N5
N5
N6
N5
N5
N7
N7
N7
N8
N9
N10
N11
N11
N12
N9
N13
Except [EK, XL]
N14 [EGA, EW, XA] only
N15 [EGA, EW, XA] only
N16
N20
N20
N9
N9
N9
N9
N9
N9
N4
N4
N4
N4
N4
N4
N3
N3
N2
N2
N1
N1
Power switch
Power transformer
Power IC
FL
Volume
[EK] only
Rear Panel
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪
⑫ ×5
⑬ ⑭ ⑮ ⑯ ⑰ ⑱ (18-1) (18-1)×2 ⑲ ⑳ ㉑
㉒ Except [EK, XL]
㉓ Except [EK, XL]
㉔ ㉕ ㉖ ㉗ ㉘ ㉙ ㉚ ㉛ ㉜ ㉝ ㉞ ㉟ ㊱
㊲ [EGA, EW, XA] only
㊳ [XA]only
㊴ ㊵
㊶ [XA] only
㊷ [XA] only
㊸ ㊹ ㊺
㊻ [EGA, EW, XA] only
㊼ ㊽ ㊾ ㊿ (51)

A	⑮ ⑯ ㊵ ⑰ ㉔ ㉓ ㉕㊷ ㊶ ㊺ ㊹ ㊸
B	④③⑤ ④⑥ ⑭ ⑬ ㊱ ⑫×5⑬⑨ (18-1) ㊳ ㉒ ⑳㉑ ⑲ ㉖ ㊻ ㉗ ㊲ ㉘ ㉛ ㉖ ㉜ ㊴㉚ ㉞ ㉟ ㉝
C	① ③ ④③ ③④⑤ ③④⑤②⑦ ⑧ ⑩ ⑪ (18-1) ⑱ (18-1)×2 ㊽ ㊼ ㊾㊿(51)

Printed in Japan
850406000 Ⓗ YK/TN

TO ALL
KDZ AND PSDG-BRANCHES

No.: 118/86	Date: 31.10.1986 rg/pr
SUBJECT	TEXT

SU-X 70

SYMPTOM

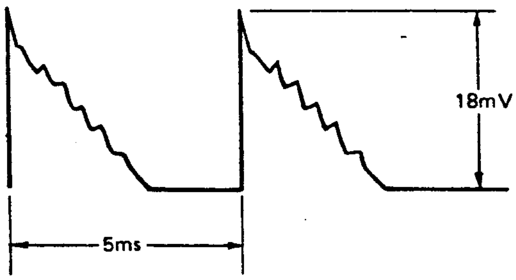
Noise is produced at minimum volume.

CHECK METHOD

When the spectrum analyzer is operating and the volume is turned down all the way, noise is produced.

CAUSE

The FL circuit ground and signal ground are reversed, and when the FL operates, digital noise flows to the signal ground, resulting in noise.



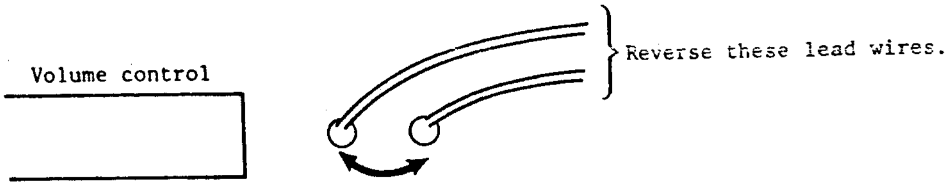
Variation is power supply voltage

No.: 118/86	Date: 31.10.1986 rg/pr
SUBJECT	TEXT

SU-X 70

REPAIR METHOD

Reverse the right and left long jumper wires on the FL circuit board.


Volume control
Reverse these lead wires.

PSDG-Wiesbaden
B. Regl
-Military SVC